

Controlling Antibiotic Resistance

A Practical Guide for Health Care
Providers, Schools, Residential &
Correctional Facilities, Dentists &
Veterinarians

Prepared through a collaborative effort between
Pierce County (Washington) Antibiotic Resistance Task Force
and Tacoma-Pierce County (Washington) Health Department



PURPOSE

This manual was created to provide a concise, practical guide for controlling the evolving problem of antibiotic resistance in a variety of health care and non-health care settings where resistant pathogens may be encountered. It was produced by the Pierce County (Washington) Antibiotic Resistance Task Force. The mission of the Task Force is to reduce the emergence and spread of antibiotic resistance in Pierce County through community-based activities aimed at promoting the appropriate use of antibiotics and enhancing infection control.

ACKNOWLEDGEMENTS

The format of this manual was inspired by a similar document produced by the Iowa Antibiotic Resistance Task Force. In addition, some of the material in this manual is taken (in many cases verbatim) from the Iowa manual and from 2 sets of guidelines published by the North Carolina Statewide Program for Infection Control and Epidemiology and the Minnesota Department of Health. The Pierce County Antibiotic Resistance Task Force extends sincere gratitude to these organizations for permission to use their material. Any errors or alterations resulting from the editing process are the responsibility of the Pierce County Antibiotic Resistance Task Force.

DISCLAIMER

Having reviewed existing literature and previously published guidelines, it is the consensus of the Pierce County Antibiotic Resistance Task Force that the guidelines in this manual are effective and practical recommendations for controlling antibiotic resistance. They do not constitute official policy.

If you have questions or comments contact your state or local health department. If you are in Pierce County, Washington, you may contact:

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HOW TO USE THIS MANUAL

This manual is organized by setting to enable the user to read specific sections without having to read the entire manual.

All providers are urged to become familiar with the following sections:

Glossary & List of Abbreviations, page 9

Introduction, page 11

Epidemiology, page 13

Two important ARMs: MRSA and VRE, page 15

Communication between facilities when transferring a patient, page 71

Education of staff and patients, page 73

Cleaning/Disinfection/Sterilization, page 75

All providers should also locate their practice setting in the table of contents on page 5 and read the section pertaining to their setting. If your specific practice setting is not listed, there may be a setting that is similar enough so the same principles apply. If you are in Pierce County, Washington and need assistance deciding which guidelines apply to your setting, call the Tacoma-Pierce County Health Department Antibiotic Resistance Program at 253-798-6410.

Periodic updates may be made available on our website, www.tpchd.org

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GLOSSARY & LIST OF ABBREVIATIONS

Antibiotic Resistant Microorganism – a germ, such as a bacteria, that is not killed or inhibited by certain antibiotics.

Antisepsis – inhibition of the growth of microorganisms. Actions taken to promote antisepsis include hand washing and cleaning of equipment.

Biosecurity – prevention of the introduction and movement of infectious diseases on an agricultural operation.

Chain of Infection – process by which a microorganism (germ) is transmitted and can cause illness.

Concepts in the chain of infection include:

Infectious agent – microorganism that can cause disease, such as viruses, bacteria, and fungi.

Reservoir – location where the infectious agent grows and multiplies, such as in people, animals, water, or soil.

Portal of Exit – method by which the infectious agent escapes from its reservoir, such as secretions, skin, droplets, and body fluids.

Means of Transmission – method by which the infectious agent is transferred to a person or animal, such as by direct contact, ingestion, insects, or through the air.

Portal of Entry – site on a person or animal where the infectious agent can enter the body, such as through mucous membranes, respiratory tract, broken skin, gastrointestinal tract, or urinary tract.

Susceptible Host – a person or animal at risk for infection, such as one with immune system dysfunction, diabetes, surgery, burns, multiple hospitalizations, or prior use of broad-spectrum antibiotics.

Cleaning – the removal of all foreign material such as soil or organic matter, from an object.

Cohorting – grouping patients with the same conditions together.

Colonization – the presence in the body or on the skin of microorganisms that are not causing disease.

Disinfection – a process that eliminates many or all pathogenic microorganisms from inanimate objects, except for bacterial spores.

Enterococci – a group of bacteria normally found in the digestive tract. These bacteria normally do not cause illness.

Infection – invasion of the body by microorganisms that are causing disease.

Infectious – capable of being transmitted or of causing infection.

Nosocomial infection – an infection that is acquired within a hospital or health care setting.

Standard Precautions – infection control measures which are based upon the assumption that *all* body fluids, secretions, and excretions can potentially transmit infections.

Sterilization – the complete elimination or destruction of all microorganisms.

Transmission-Based Precautions – additional infection control measures used for patients known or suspected to be infected or colonized with certain important pathogens, such as antibiotic resistant microorganisms.

Virulence – the relative ability of a microorganism to cause disease.

Abbreviations Used in this Manual

AAP – American Academy of Pediatrics

ACIP – Advisory Committee on Immunization Practices

ADA – Americans with Disabilities Act

ARM – Antibiotic resistant microorganism
AVMA – American Veterinary Medical Association
CDC – Centers for Disease Control and Prevention
DRSP – Drug-resistant *Streptococcus pneumoniae*
EMS – Emergency Medical Services
EPA – Environmental Protection Agency
ID – Infectious disease
LTCF – Long term care facility
MMWR – Mortality and Morbidity Weekly Report (published by CDC)
MRSA – Methicillin-resistant *Staphylococcus aureus*
OSHA – Occupational Safety and Health Administration
PCV-7 – Pneumococcal conjugate vaccine
URI – Upper respiratory infection
VRE – Vancomycin-resistant enterococcus
WAC – Washington Administrative Code

INTRODUCTION

The treatment of infectious disease took a great leap forward with the first clinical use of penicillin in 1941. Diseases that had been deadly in the pre-antibiotic era could now be treated easily and safely. But soon after antibiotics were introduced, bacteria began demonstrating resistance to these compounds. The increased use of antibiotics in medicine and agriculture over the past 60 years has been accompanied by sharp increases in the prevalence of microorganisms that are resistant to antibiotics.

Antibiotic resistance is an almost inevitable result of antibiotic use. Microbes develop ways to evade the effects of antibiotics in response to exposure to these drugs. This is especially evident in the hospital setting, where acutely ill patients are often treated with a barrage of antibiotics. An estimated 2 million people acquire nosocomial (acquired within a health care setting) infections every year in the United States. A growing number of these infections are resistant to one or more antibiotics, resulting in treatment failures, higher mortality, and increased cost of care.

While many antibiotic resistant infections occur in hospitals, they are increasingly seen in the community. Due to widespread use of antibiotics in society, anyone can unknowingly carry resistant bacteria. This means that *infection control is a concern that is not restricted to the hospital*. Schools, assisted living centers, prisons, and other facilities can encounter persons who carry resistant pathogens.

Strains of bacteria that are resistant to antibiotics are not more likely to make a person sick, nor do they necessarily cause more serious illness, than strains of the same bacteria that are not resistant. However, if a patient is treated with an antibiotic that is ineffective against the bacteria causing an infection, the treatment may fail, allowing the infection to worsen.

Careful use of antibiotics in the medical setting is one response to the problem. However, even with the most prudent use of antibiotics, some resistance will occur. Therefore, *preventing the spread* of resistant microbes is critical to controlling the adverse impact of antibiotic resistance.

In 2000, the Tacoma-Pierce County (Washington) Health Department convened a Task Force to address the problem of antibiotic resistance. With the challenges faced by infection control programs, such as varying goals and responsibilities and wide-ranging experience of those responsible for infection control, the Task Force identified a need to develop guidelines for preventing the spread of antibiotic-resistant microorganisms (ARMs) in specific medical and community settings. Protocols that are focused on preventing bloodborne pathogen transmission are not adequate for interrupting the spread of resistant pathogens since blood seldom is a mode of transmission for ARMs. In addition, fear and misinformation about “superbugs” can lead to unnecessary restrictions.

The guidelines contained in this document are intended to provide factual information and encourage a consistent approach to infection control and controlling ARMs. They include specific information on antibiotic use, immunization, and infection control for different types of community and medical settings. Facilities with infection control programs are further encouraged to include antibiotic utilization reviews in order to promote the rational use of antibiotics.

EPIDEMIOLOGY OF ANTIBIOTIC RESISTANT MICROORGANISMS

Antibiotic resistant microorganisms (ARMs) contribute to increased mortality, morbidity, and significantly higher health care costs. One report placed the annual cost in the US of methicillin-resistant *Staphylococcus aureus* (MRSA) at \$122 million. While resistant pathogens are generally no more virulent than susceptible pathogens, resistant infections are more difficult to treat and appropriate treatment is often delayed. The growing number of immunocompromised individuals represent a particularly vulnerable population.

According to the CDC's National Nosocomial Infections Surveillance System, the proportion of *Staphylococcus aureus* isolates resistant to methicillin (MRSA) rose from 2.4% in 1975 to 29% in 1991. In 1989, 0.3% of enterococcal isolates were resistant to vancomycin (VRE) while in 1993, 7.9% were resistant. By 1991, 32.4% of gonococcal isolates were resistant to penicillin, tetracycline, or both. The story is similar for other pathogens. Resistant infections can occur in health care settings and in the general community. In 1999 the CDC reported that 4 previously healthy children in the upper midwest developed fatal MRSA infections.

In Pierce County, Washington the proportion of *Staphylococcus aureus* isolates that were resistant to methicillin rose from 8% in 1995 to 25% in 2000. In most cases of MRSA the bacteria are resistant to almost all classes of drugs, leaving few viable treatment options. In 2001, there were more than 690 reported cases of MRSA in Pierce County (total county population 700,000). The proportion of enterococci that were resistant to vancomycin rose in Pierce County from 0% in 1995 to 3.6% in 2000, and 30 cases of VRE were reported to the health department in 2001. VRE is resistant to multiple drugs.

The spread of resistant organisms from patient to patient is facilitated by the hands of health care workers and/or equipment that is not properly cleaned or disinfected between patients. Environmental contamination is also a concern; one study found that enterococci and staphylococci can survive for weeks on fabric or plastic surfaces that can be found in hospital rooms. Lack of communication between facilities can lead to interfacility spread of resistant organisms. Misperceptions and misinformation about infection and/or colonization with resistant organisms can contribute to real or perceived client isolation and dissatisfaction.

Colonization vs. Infection

A person who has an ARM may either be colonized or infected with the ARM. *Colonization* means that the bacteria is present in or on the body, but *is not* causing illness. *Infection* means that the bacteria is present and *is* causing illness. For example, if an ARM is living on the skin and the skin is intact (no sores, wounds, etc.), the person is colonized. On the other hand, if an ARM is growing in a wound that is red and has pus in it, the person is considered infected with the ARM.

TWO IMPORTANT ARMS: MRSA AND VRE

Two of the most common and important ARMs are Methicillin-Resistant *Staphylococcus aureus* (MRSA) and Vancomycin-resistant enterococcus (VRE).

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Staphylococcus aureus is a common bacteria found on the skin or nose of many healthy people. It does not normally cause illness. However, it can cause infection if it enters the body, for example if it gets into a wound, the lungs, or bloodstream. MRSA is a type of *Staphylococcus aureus* that is resistant to several drugs. A very small percentage of people carry MRSA without being sick with it or being aware of it (this is called colonization). By definition, MRSA must be resistant to one or more of the following semi-synthetic penicillins: methicillin, oxacillin, or nafcillin. MRSA is neither more infectious nor more virulent than susceptible strains of *S. aureus*; it is just more difficult to treat.

Mode of Transmission - MRSA is transmitted primarily by contact with a person who is infected or colonized with the organism. *Hands of personnel appear to be the most likely mode of transmission of MRSA from patient to patient.* Studies have demonstrated that MRSA can be present on the hands of personnel after performing such activities as wound cleaning, dressing changes, tracheal suctioning, and catheter care. It can also be transmitted between animals and people (in both directions).

Reservoirs - Colonized and infected people are the major reservoir of MRSA. MRSA has been found on environmental surfaces including floors, sinks, work areas, tourniquets used for blood drawing, and blood pressure cuffs, although these surfaces are not the most likely source of spread, the most likely source being caregivers' hands. However, environmental surfaces should be disinfected routinely to reduce bacterial load.

Risk Factors - The factors that have been identified as increasing the risk that a patient will have a MRSA infection are:

- ◆ Formulary restrictions
- ◆ Increased length of hospital stay
- ◆ Multiple hospitalizations
- ◆ Over 65 years old
- ◆ Multiple invasive procedures
- ◆ Invasive devices such as urinary catheters or gastrostomy tubes
- ◆ Wounds
- ◆ Severe underlying disease
- ◆ Administration of broad spectrum antibiotics

Among hospitalized patients who acquire MRSA colonization, 30-60% eventually will develop MRSA infections such as a wound infection, bacteremia, urinary tract infection, or pneumonia. However, unlike hospitalized patients, only 5-15% of residents in LTCFs who acquire MRSA colonization subsequently will develop MRSA infections.

Vancomycin-resistant Enterococci (VRE)

Enterococci are a group of bacteria common in the digestive tract of healthy people. They do not normally cause illness. However, they can cause infection if they enter the body and invade a normally sterile site, for example a wound, the urinary tract, or bloodstream. People with chronic diseases such as diabetes and those with suppressed immune systems are more vulnerable to infection due to enterococci. VRE is a type of enterococci that is resistant to several drugs. A very small percentage of people carry VRE without being sick with it or being aware of it (colonization).

Mode of Transmission - VRE can spread from patient to patient via the hands of personnel or indirectly via contaminated environmental surfaces and patient care equipment.

Reservoirs - Enterococci are part of the normal flora of the gastrointestinal tract and female genitourinary tracts. Most infections with these microorganisms have been attributed to patients' own bacteria. However, a recent study found VRE can survive on hands, gloves, and environmental surfaces for several days.

Risk Factors – People who are at increased risk for VRE infection or colonization are patients who have:

- ◆ A critical illness
- ◆ Severe underlying disease or immune suppression
- ◆ Had an intraabdominal or cardiothoracic surgical procedure
- ◆ An indwelling urinary or central venous catheter
- ◆ Had a prolonged hospital stay
- ◆ Had broad spectrum antibiotic therapy
- ◆ Received administration of oral and, to a lesser extent intravenous (IV), vancomycin.

ACUTE CARE

The CDC has proposed a 12-step program to prevent antibiotic resistance in hospitalized patients. The steps are as follows:

1. Vaccinate
2. Get the catheters out
3. Target the pathogen
4. Access the experts
5. Practice antibiotic control
6. Use local data
7. Know when to say “no” to vancomycin
8. Treat infection, not contamination
9. Treat infection, not colonization
10. Stop treatment when infection is unlikely or cured
11. Isolate the pathogen
12. Break the chain of infection

Note: the above is a draft, used here with permission, which at the time of this printing is not available in published form. In the future it may be available in fuller detail from the CDC (www.cdc.gov).

Antibiotic Use & Immunization

Antibiotics are one of the most commonly used types of drugs in acute care facilities. The tremendous selection pressure placed on bacteria by antibiotics used in hospitals has resulted in significant increases in resistance. Therefore, controlling unnecessary or inappropriate use of antibiotics in these settings is of critical importance. Methods for control are beyond the scope of this manual. However, suggestions for institutional measures for controlling antibiotic use include:

- ◆ Formulary restrictions
- ◆ Computer-assisted prescribing
- ◆ Requiring an ID consult for prescribing selected drugs, such as vancomycin
- ◆ Automatic stop orders
- ◆ Policies regarding surgical prophylaxis
- ◆ Practice profiling – providing individualized feedback to providers
- ◆ Emphasis on narrow-spectrum agents
- ◆ Better availability and utilization of diagnostic tests
- ◆ Antibiotic rotation.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Emphasis should be placed on immunizing hospitalized adults against influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza transmission among hospitalized patients. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic

illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age. Standing orders can increase immunization rates, although they do not eliminate the need to evaluate each patient individually for appropriateness and the presence of contraindications. All patients' immunization status should be reviewed and updated prior to discharge.

Infection Control

Acute care facilities should have in place comprehensive infection control policies and procedures based on CDC Guideline for Isolation Precautions in Hospitals, 1996. The information below by no means is meant to supplant guidelines in place in acute care facilities. Rather, it is a very brief synopsis of a few highlights of infection control that are of particular importance in controlling ARMs.

Infection Control Plan

It is recommended that every health care facility develop a comprehensive, institution-specific, written infection control plan. It should include a surveillance plan for identifying and monitoring infections and for preventing transmission between patients and staff, volunteers or visitors. The plan should include policies regarding hand washing, education, isolation precautions, discontinuing isolation precautions, environmental cleaning, patient placement, and group activities. The plan should also include reporting of communicable diseases as required by the state and local health departments. A member of the staff should be responsible for overseeing, reviewing and approving the activities of the infection control program.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

Standard Precautions should be used during all encounters with all patients. These precautions are based on the assumption that any patient can be carrying an infectious microorganism of which neither the patient nor health care provider is aware.

Standard Precautions are designed to incorporate the protection against bloodborne pathogens achieved by *Universal Precautions* and the protection against other pathogens achieved by *Body Substance Isolation*. Standard Precautions are to be used for ALL patients, regardless of their diagnosis or presumed infectious status, when the health care worker comes into contact (or is at risk for contact) with any of the following: (1) blood, (2) all body fluids, secretions and excretions except sweat, (3) mucous membranes, and (4) non-intact skin.

Standard Precautions consist of the following components:

- ◆ Hand washing / antisepsis, as described above.
- ◆ Single use disposable gloves must be worn whenever contact with patients' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out when gloves are removed.
- ◆ Masks and eye protection or face shields must be worn whenever splashing or splatter is likely.
- ◆ Gowns or protective aprons must be worn when personal clothing may be soiled.
- ◆ Regular cleaning or disposal of patient care equipment and environmental surfaces with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).
- ◆ Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- ◆ Patients with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

Transmission-Based Precautions

Transmission-Based Precautions consist of measures to be used *in addition* to Standard Precautions in cases when a patient is believed or known to have an ARM. There are 3 types of Transmission-Based Precautions: Contact, Droplet, and Airborne, which may be used alone or in conjunction with each other depending on the organism and site of infection. Contact precautions are the most commonly needed for patients with ARMs.

Contact Precautions are designed to reduce the risk of transmission by direct or indirect contact. *Direct contact* involves skin-to-skin contact; *indirect contact* involves contact with a contaminated object in the patient's environment. Contact Precautions are the most frequently used precautions for patients with ARMs such as MRSA or VRE.

Contact Precautions include the following:

- ◆ Place patient in a private room or a room with a patient with the same ARM. If this is not possible, the roommate should have no open wounds, no invasive devices (e.g., tracheostomy, nasogastric tube, IV line, foley catheter) and should not be immunosuppressed.
- ◆ Wear gloves at all times while in the room and change them after touching potentially infective material. Do not touch clean environmental surfaces with potentially contaminated gloves.
- ◆ Wash hands immediately after removal of gloves and before leaving the room.
- ◆ Do not touch potentially contaminated surfaces or items with clean hands.
- ◆ Wear a gown when entering the room if you anticipate your clothing coming in contact with the patient, environmental surfaces or items in the room, or if the patient is incontinent, has an ileostomy or colostomy, has diarrhea, or wound drainage not contained by a dressing. Remove gown and place it in a trash container (or laundry hamper if reusable) before leaving the room and wash hands. Avoid recontaminating the hands after washing (e.g. by touching a doorknob).
- ◆ Masks, eye protection and face shields should be worn by staff during resident care activities if splashes, sprays of blood, body fluids are likely. The health care provider should also wear a mask if the patient has MRSA and is coughing.
- ◆ Limit patient transport within the facility.
- ◆ Dedicate the use of non-critical equipment (such as stethoscope, blood pressure cuff, and thermometer) to a single patient or group of patients with the same ARM. If use of common

equipment is unavoidable, then item must be cleaned and disinfected prior to use on another patient.

Airborne Precautions are indicated when the infectious agent is a small particle or evaporated droplets that are capable of remaining suspended in the air for long periods of time. Examples of these diseases include tuberculosis, measles, and varicella (including disseminated herpes zoster).

Droplet Precautions are indicated when the infectious agent is known to be a large particle droplet generated by sneezing, coughing, talking, or during the performance of certain cough-inducing procedures such as suctioning, sputum induction or bronchoscopy. Examples of these diseases include respiratory MRSA (which also requires contact precautions), rubella, meningococcal meningitis, mumps, and pertussis.

Discontinuing Precautions

MRSA – patients with MRSA may have Contact Precautions discontinued after three consecutive cultures taken one week apart are negative for MRSA. These cultures should be taken from each previously infected or colonized site and from the anterior nares. Some facilities also include the axilla, perineum and any open wounds in their basic protocol. These cultures should be taken at least 72 hours after antibiotics have been discontinued.

VRE – A patient with VRE may have Contact Precautions discontinued when three successive negative cultures (stool or rectal swab cultures and initial site of infection/colonization) obtained at least one week apart are reported. These cultures should be taken at least 48-72 hours after antibiotics used for treatment have been discontinued.

For more information, see:

Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. *Infection Control and Hospital Epidemiology*. 1996;17:53-80. Available at: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>.

Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. *American Journal of Infection Control*. 1996;24:24-52. Available at: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>.

ANIMAL AGRICULTURE

Increasing attention is being paid to the issue of antibiotic resistance in animal agriculture. The Agriculture/Veterinary Committee of the Antibiotic Resistance Task Force is dedicated to facilitating communication and collaboration aimed at decreasing the emergence and spread of antibiotic resistant microorganisms (ARMs) in agricultural settings. Some basic information on antibiotic use and biosecurity is presented below, as well as resources where more in-depth information can be found. Producers are encouraged to contact industry associations that may also provide further assistance.

Antibiotic Use

Antibiotics are used widely in agricultural settings for purposes of disease treatment, prevention, and growth promotion. ARMs have been found in farm animals, farm workers, groundwater near farms, and even on meat purchased in grocery stores. While the full impact of these ARMs on animal and human health is not known, there have been reports of farm workers becoming ill from ARMs transmitted from animals, and the Food and Drug Administration (FDA) estimates that in 1999 over 150,000 people in the US acquired fluoroquinolone- (an antibiotic) resistant campylobacter infections after consuming improperly handled chicken.

In light of these facts, it is critical that antibiotics be used prudently in livestock operations. This topic is too broad to be addressed in this manual, but several resources listed below provide further information. In addition, a guideline on antibiotic use published by the American Veterinary Medical Association can be found in the Veterinary Section of this manual, and specific guidelines for judicious antibiotic use in cattle, poultry, swine, and horses are available at the AVMA's website, www.avma.org.

Infection Control (Biosecurity)

According to the Bovine Alliance on Management and Nutrition, “in the future, producers may be responsible for potential pathogen contamination of the food supply or environment.” They also refer to the devastating impact that infectious diseases (of any kind) can have on cash flow and market access in the agricultural industry, and conclude, “with the stakes so high, biosecurity should be a very high priority in day-to-day management.” Biosecurity includes policies and procedures that prevent or reduce the spread of infectious diseases within and between agricultural operations. These procedures can reduce not only the spread of antibiotic resistant microorganisms, but other important pathogens such as foot and mouth disease.

The following are basic principles that can be incorporated into a biosecurity program for the animal agricultural operation:

- ◆ Limit access to only essential personnel.
- ◆ Separate healthy and sick animals, and use different equipment with each group.

- ◆ Use disposable health care equipment whenever possible, or disinfect reusable equipment between animals.
- ◆ Work with healthy animals before working with sick animals. If moving from sick to healthy animals, disinfect or change clothing and footwear before contact with healthy animals.
- ◆ Work from younger to older animals.
- ◆ Keep newly introduced livestock separated for an amount of time sufficient to detect disease before mixing with the rest of the herd/flock.
- ◆ Provide all appropriate vaccinations to livestock.
- ◆ Monitor the health of your livestock and immediately notify a veterinarian of any unusual symptoms or clusters of illness. Keep records of animal illnesses.
- ◆ Minimize the entry of wildlife, rodents, and insects onto your operation, as much as possible.
- ◆ Prevent contamination of feed and water with manure and urine.
- ◆ Maintain good ventilation in indoor animal containment areas.
- ◆ Purchase livestock, feedstuffs, and supplies from reputable sources that can guarantee their animals are free from infection and products are free from contamination.
- ◆ Anyone who has been on another livestock operation should disinfect their shoes or boots and clothing before entering your premises.
- ◆ Vehicles and equipment that have been on other livestock operations or that haul livestock should be disinfected before entering or leaving your premises, with particular attention to the tires.

ADDITIONAL RESOURCES:

Doyle E. *Alternatives to Antibiotic Use for Growth Promotion in Animal Husbandry*. University of Wisconsin Food Research Institute. April 2001. Available at: www.wisc.edu/fri/briefs/antibiot.pdf.

Food and Drug Administration. *Human Health Impact of Fluoroquinolone Resistant Campylobacter Attributed to the Consumption of Chicken*. Center for Veterinary Medicine; October 18, 2000, revised January 5, 2001.

Bovine Alliance on Management and Nutrition. *Introduction to Infectious Disease Control on Farms (Biosecurity)*. Arlington, VA. 2001. Available at: http://www.aphis.usda.gov/vs/ceah/cahm/Dairy_Cattle/BAHMBiosecur.pdf.

Keep Antibiotics Working Campaign. Information on Antibiotic Use on the Farm available online: <http://www.keeppantibioticsworking.com/Library/index.cfm>.

World Health Organization. *The Medical Impact of the Use of Antimicrobials in Food Animals: Report of a WHO Meeting, Berlin, Germany, 13-17 October 1997*. Available at: http://www.keeppantibioticsworking.com/library/uploadedfiles/Medical_Impact_of_the_Use_of_Antimicrobials_in.htm

Nap W. *Building a Strategy for the Swine Industry*. Etobicoke, Ontario: Ontario Pork Producers Marketing Board; 2001. Available at: http://www.keeppantibioticsworking.com/library/uploadedfiles/Building_a_Strategy_for_the_Swine_Industry.htm.

USDA Center for Animal Health Monitoring – resources at: <http://www.aphis.usda.gov/vs/ceah/cahm/>.

Whale D. *Building a Future Strategy for the Poultry Industry*. Alma, Ontario: Poultry Industry Council; 2001. Available at:
http://www.keepantibioticsworking.com/library/uploadedfiles/Building_a_Future_Strategy_for_the_Poultry_Ind.htm.

CHEMICAL DEPENDENCY TREATMENT CENTER

Antibiotic Use & Immunization

Upper respiratory infections (URIs) such as the common cold are one of the most frequent illnesses for which people receive antibiotics. However, most URIs are caused by viruses, which are not killed by antibiotics. Taking an antibiotic unnecessarily can promote antibiotic resistance. Providers with prescriptive authority should refer to the appendix for guidelines on treating common URIs. Staff and clients should be educated to keep the following points in mind regarding treatment of URIs:

- ◆ The best ways to prevent colds are (1) maintaining the immune system through a healthy diet, exercise, and stress-relief and (2) washing one's hands frequently, especially after using the bathroom and coughing.
- ◆ Most sore throats, sinus infections, coughs, and cases of bronchitis do not require antibiotic treatment.
- ◆ Antibiotics should not be taken unnecessarily because they can cause side effects and promote antibiotic resistance .
- ◆ The common cold usually lasts about 10 days and gets better on its own.
- ◆ A person who has a cold should get plenty of rest, avoid alcohol and smoking, and drink lots of fluids.
- ◆ Allow a health care provider to decide if an antibiotic is needed; don't pressure him or her to order one.
- ◆ If an antibiotic is given, it should be taken exactly as prescribed until it is all gone (stopping it too soon allows resistant bacteria to take over).
- ◆ Never save leftover antibiotics for later use or share them with other people.

Immunizations can reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Adults over 50 years of age and pregnant women who will be beyond the 1st trimester during flu season should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against pneumococcal disease. Youths should be immunized following ACIP/AAP recommendations.

Infection Control

- ◆ Admission should not be denied on the basis of colonization with an antibiotic-resistant organism.
- ◆ All clients and staff should practice appropriate hand washing, as described below.
- ◆ Every client should have his/her own toothbrush, toothpaste, comb and razor. These items should not be shared with anyone.
- ◆ Clean clothes and linens should be provided on a regular basis.

- ◆ There should be a routine of housekeeping chores that allows clients proper management of personal items and disposal of waste.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL clients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

CORRECTIONAL FACILITIES

Antibiotic Use & Immunization

Upper respiratory infections (URIs) such as the common cold are one of the most frequent illnesses for which people receive antibiotics. However, most URIs are caused by viruses, which are not killed by antibiotics. Taking an antibiotic unnecessarily can promote antibiotic resistance. Providers with prescriptive authority should refer to the appendix for guidelines on treating common URIs. Staff and inmates should be educated to keep the following points in mind regarding treatment of URIs:

- ◆ The best ways to prevent colds are (1) maintaining the immune system through a healthy diet, exercise, and stress-relief and (2) washing one's hands frequently, especially after using the bathroom and coughing.
- ◆ Most sore throats, sinus infections, coughs, and cases of bronchitis do not require antibiotic treatment.
- ◆ Antibiotics should not be taken unnecessarily because they can cause side effects or promote antibiotic resistance.
- ◆ The common cold usually lasts about 10 days and gets better on its own.
- ◆ A person who has a cold should get plenty of rest, avoid alcohol and smoking, and drink lots of fluids.
- ◆ Allow a health care provider to decide if an antibiotic is needed; don't pressure him or her to order one.
- ◆ If an antibiotic is given, it should be taken exactly as prescribed until it is all gone (stopping it too soon allows resistant bacteria to take over).
- ◆ Never save leftover antibiotics for later use or share them with other people.

Immunizations can reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Adults over 50 and pregnant women who will be beyond the 1st trimester during flu season should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against pneumococcal disease. Youths should be immunized following ACIP/AAP recommendations

Infection Control

Upon suspicion of a communicable disease, a health care provider must examine the inmate promptly. The inmate should be kept in a room separate from other inmates until a determination is made as to the necessity for and type of isolation required. When a need for isolation has been identified, all personnel must carefully comply with any posted precautions.

If possible, an inmate with an ARM should be accommodated in a separate room/cell with a separate toilet, hand washing facility, soap dispenser and disposable towels. *Hand washing is the single most*

important means of preventing the spread of infection. Soap, water and towels must be readily available.

Precautions to be used for inmates with ARMs include:

- ◆ Staff and visitors should wash their hands before entering and immediately after leaving the inmate's room/cell.
- ◆ Instruct the inmate to wash his/her hands before leaving the room/cell and any time the hands are contaminated with wound drainage.
- ◆ Use gloves whenever contact with the inmate's blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antiseptics must be carried out when gloves are removed.
- ◆ Masks, eye protection, or face shields must be worn whenever splashing or splatter of body fluids is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled with the inmate's body fluids.
- ◆ Regular cleaning or disposal of medical equipment used to care for the inmate.
- ◆ Regular cleaning of all environmental surfaces.
- ◆ Linen contaminated with body fluids should be handled with gloves and kept away from one's own clothing.
- ◆ Inmates with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Clean clothes and linens should be provided on a regular basis.
- ◆ Every inmate should have his/her own toothbrush, toothpaste, comb and razor. These items should not be shared with anyone.
- ◆ There should be a routine of housekeeping chores that allows the inmate proper management of personal items and disposal of waste.

See also:

National Commission on Correctional Health Care. *Standard for Health Services in Prisons*; November 1998.

Commission on Correctional Health Care. *Guidelines for the Management of an Adequate Delivery System*; March 1999.

DENTAL CLINICS

Antibiotic Use

The American Dental Association, American Heart Association, and American Academy of Orthopaedic Surgeons have published recommendations for antibiotic prophylaxis against bacterial endocarditis and prosthetic joint infection in patients undergoing dental treatment. Changes in these recommendations have occurred in the past few years, so dentists are encouraged to review these protocols carefully and to consult the March 2000 issue of the Journal of the American Dental Association, which contains more detailed information including recommendations for drug choices and dosing.

The latest changes include a trend towards refining the definitions of patients who are at significant risk, limiting the number of dental procedures for which prophylaxis is used, and a new recommendation against routinely using antibiotic prophylaxis for patients with prosthetic joint replacements.

Two factors should be taken into consideration when making the decision about whether or not to provide antibiotic prophylaxis to a patient. The *first* consideration is if there is a condition that places the patient at risk. *If so*, the *second* consideration is the type of dental procedure the patient is to undergo. If the decision is made to provide prophylaxis, factors to be considered when choosing a drug and dose include allergies and the ability to take oral medication.

Medical condition consideration for antibiotic prophylaxis

Prophylaxis IS recommended during a high-risk procedure (defined in box below) for patients with:

- | | |
|--|--|
| ◆ Valvular heart disease | ◆ Prosthetic heart valve |
| ◆ Previous endocarditis | ◆ Vascular graft in place less than 6 months |
| ◆ Surgical pulmonary shunts | ◆ Renal hemodialysis with arteriovenous (AV) shunt |
| ◆ Hypertrophic cardiomyopathy | ◆ Ventriculoatrial (VA) shunt for hydrocephalus |
| ◆ Mitral valve prolapse with regurgitation | |

Prophylaxis is NOT recommended for patients with:

- | | |
|---|---|
| ◆ Orthopedic prostheses in place more than 2 years (except in exceptional cases of immune compromise) | ◆ Ventriculoperitoneal (VP) shunt for hydrocephalus |
| ◆ Implanted pacemaker or defibrillator | ◆ Patient with immune system compromise, in most cases (may consider prophylaxis for invasive procedures in some situations) |
| ◆ Vascular graft in place more than 6 months | ◆ Prevention of local infection in surgical sites, although treatment of coexisting infection is recommended before surgical procedures |
| ◆ Previous coronary bypass graft surgery | |

Dental procedure consideration for antibiotic prophylaxis

Procedures for which prophylaxis should be considered in patients with high-risk medical conditions (defined in box above):

- | | |
|---|--|
| <ul style="list-style-type: none">◆ Dental extractions◆ Periodontal procedures including surgery, scaling, root planing, & probing◆ Dental implant placement, reimplantation of teeth◆ Endodontic instrumentation or surgery beyond the tooth apex | <ul style="list-style-type: none">◆ Subgingival placement of antibiotic fibers or strips◆ Initial placement of orthodontic bands but not brackets◆ Intraligamentary local anesthetic injections◆ Prophylactic cleaning of teeth or implants with anticipated bleeding |
|---|--|

Procedures for which antibiotic prophylaxis is NOT recommended:

- | | |
|--|---|
| <ul style="list-style-type: none">◆ Restorative dental procedures with or without retraction cord◆ Local anesthetic injections (except for intraligamentary)◆ Intracanal endodontic procedures, post placement and buildup◆ Placement of rubber dams◆ Postoperative suture removal | <ul style="list-style-type: none">◆ Placement of removable orthodontic or prosthodontic appliances◆ Taking oral impressions◆ Fluoride treatments◆ Taking oral radiographs◆ Orthodontic appliance adjustment◆ Shedding of primary teeth |
|--|---|

Source: Tong D, Rothwell B. Antibiotic prophylaxis in dentistry: A review and practice recommendations. *JADA*. 2000;131:366-374.

Some patients will indicate a history of heart murmur without providing detailed information on a specific cardiac defect. Guggenheimer, et al studied patients with a reported history of heart murmur and found that 65% did not have evidence of a pathological murmur. They recommended that self-report of a murmur should not be the sole criterion for prescribing antibiotic prophylaxis for dental procedures. Rather, the patient should undergo a medical evaluation before continuing dental care.

Source: Guggenheimer J, Orchard T, Moore P, Myers D, Rossie K. Reliability of self-reported heart murmur history: Possible impact on antibiotic use in dentistry. *JADA*. 1998;129:861-866.

Infection Control

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is

visible blood, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

Standard Precautions should be used during all encounters with all patients. These precautions are based on the assumption that any patient or client can be carrying an infectious microorganism of which neither the patient nor health care provider is aware.

Standard Precautions are designed to incorporate the protection against bloodborne pathogens achieved by *Universal Precautions* and the protection against other pathogens achieved by *Body Substance Isolation*. Standard Precautions are to be used for ALL patients, regardless of their diagnosis or presumed infectious status, when the health care worker comes into contact (or is at risk for contact) with any of the following: (1) blood, (2) all body fluids, secretions and excretions except sweat, (3) mucous membranes, and (4) non-intact skin.

Standard precautions consist of the following components:

- ◆ Hand washing / antisepsis should be done whenever hands are soiled, after removing gloves, and between all patient contacts.
- ◆ Single use disposable gloves must be worn whenever contact with patients' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out when gloves are removed.
- ◆ Masks, eye protection, or face shields must be worn whenever splashing or splatter is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled.
- ◆ Regular cleaning or disposal of patient care equipment and environmental surfaces with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).
- ◆ Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- ◆ Patients with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

For more detail, see:

Centers for Disease Control and Prevention. Recommended infection-control practices for dentistry, 1993. MWMR 1993;42(No. RR-8). Available at:
<http://www.cdc.gov/mmwr/preview/mmwrhtml/00021095.htm>.

EMERGENCY MEDICAL SERVICES AND PATIENT TRANSPORT

Emergency Services: Lacking specific patient history, emergency medical services (EMS) personnel may not know a patient is colonized or infected with an antibiotic resistant microorganism (ARM). These so-called "super-bugs" do not pose any additional risk to most personnel. However, it is important to avoid contamination of staff and equipment, in order to prevent transmission of the ARM from the contaminated staff or equipment to other patients, whose defenses may be compromised. Therefore, Standard Precautions (#1-11 below) apply to *all* patient contacts. Additional precautions (#12 below) apply to patients known to be colonized or infected with ARMs.

Non-emergency transportation: It is the responsibility of the transferring facility to inform the receiving facility and EMS personnel of the patient's ARM colonization or infection status. The facility from which the patient is being transferred should complete a *Transfer Form* (see appendix) on all patients with ARMs and place it on top of the other transfer paperwork, so that the receiving facility will be alerted of the patient's status immediately.

Infection Control

Standard Precautions for all patient contact

- ◆ Wear disposable gloves whenever contact with blood, body fluids, non-intact skin, mucous membranes or contaminated environmental surfaces is reasonably anticipated. Change gloves when visibly soiled, between procedures such as starting IVs and caring for wounds or urinary catheters. Gloves should be removed before entering the driving compartment.
- ◆ Wear gowns or other fluid-resistant attire when contamination of clothing with blood or body fluids is reasonably anticipated.
- ◆ Wear a standard surgical mask when transporting a patient who has a respiratory infection and an active cough. A standard surgical mask may be placed on the patient if it does not interfere with breathing or care. If tuberculosis is suspected, employees should wear N-95 particulate respirators that have been fit tested for each staff member. The patient may wear a standard surgical mask if it does not interfere with breathing or care.
- ◆ Wear a mask and goggles or a face shield when blood or body fluid splash to caregiver's face is reasonably anticipated.
- ◆ Position sharps disposal units at point of use and discard used/contaminated needles and other sharps according to company protocol, OSHA Bloodborne Pathogens Standard and state/local regulations.
- ◆ Bag used linen as close to the ambulance as possible, keeping it away from caregiver's clothing. Wear gloves to handle all soiled linen and place in leak-resistant bags.
- ◆ Keep supply cabinet doors in the ambulance closed whenever possible.
- ◆ Discard blood- or body fluid-contaminated medical waste, including disposable equipment, into appropriately marked or color coded containers according to company protocol, OSHA Bloodborne Pathogens Standard and state/local regulations.

- ◆ Use an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>) to decontaminate reusable equipment and environmental surfaces including blood pressure cuffs, stethoscopes, stretcher, straps, equipment bags and door handles touched by the patient or worker's gloved hands during care/transport.
- ◆ A waterless alcohol-based hand antiseptic may be used between tasks and changing of gloves.
- ◆ Wash hands with soap and water after removal of gloves, unprotected contact with contaminated environmental surfaces, blood, body fluids, non-intact skin or mucous membranes and upon completion of every run.

Additional precautions for patients colonized or infected with antibiotic resistant microorganisms

- ◆ Notify receiving facility of patient's ARM colonization/infection status.

HEMODIALYSIS FACILITY (OUTPATIENT)

Antibiotic Use & Immunization

Hemodialysis patients commonly have frequent infections requiring antibiotic treatment, due in part to depressed immunity and invasive devices and procedures. This makes dialysis patients at very high risk for acquiring antibiotic resistant pathogens. One of the best ways to reduce antibiotic use in this population is by preventing infection through meticulous infection control, described below. When infection occurs, a culture and sensitivity should be obtained, if possible, in order to target the pathogen with the narrowest spectrum drug that is active against the offending organism. In addition, the patient's renal function must be considered when dosing a drug that is metabolized in the kidneys. Published guidelines for vancomycin use should be consulted.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Emphasis should be placed on immunizing dialysis patients against influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza morbidity in patients. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations. Children with chronic illness should be considered for pneumococcal vaccine.

Infection Control

Meticulous infection control is critical to protecting hemodialysis patients. An infection control program should be in place and periodically reviewed, and staff, patients, and families should receive regular education. A surveillance program for tracking patients' infections should also be in place.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

The following infection control precautions should be used with *all* hemodialysis patients:

- ◆ Wear disposable gloves when caring for the patient or touching the patient's equipment at the dialysis station; remove gloves and wash hands between each patient or station.
- ◆ Items taken into the dialysis station should either be disposed of, dedicated for use only on a single patient, or cleaned and disinfected before taken to a common clean area or used on another patient.
- ◆ Nondisposable items that cannot be cleaned and disinfected (e.g., adhesive tape, cloth-covered blood pressure cuffs) should be dedicated for use only on a single patient.
- ◆ Unused medications (including multiple dose vials containing diluents) or supplies (syringes, alcohol swabs, etc.) taken to the patient's station should be used only for that patient and should not be returned to a common clean area or used on other patients.
- ◆ When multiple dose medication vials are used (including those containing diluents), prepare individual patient doses in a clean, centralized area away from dialysis stations and deliver separately to each patient. Do not carry multiple dose medication vials from station to station.
- ◆ Do not use common medication carts to deliver medications to patients. Do not carry medication vials, syringes, alcohol swabs or supplies in pockets. If trays are used to deliver medication to individual patients, they must be cleaned between patients.
- ◆ Clean areas should be clearly designated for the preparation, handling and storage of medications and unused supplies and equipment. Clean areas should be clearly separated from contaminated areas where used supplies and equipment are handled. Do not handle and store medications or clean supplies in the same or an adjacent area to that where used equipment or blood samples are handled.
- ◆ Use external venous and arterial pressure transducer filters/protectors for each patient treatment to prevent blood contamination of the dialysis machines' pressure monitors. Change filters/protectors between each patient treatment, and do not reuse them. Internal transducer filters do not need to be changed routinely between patients.
- ◆ Clean and disinfect the dialysis station (chairs, beds, tables, machines, etc.) between patients.
- ◆ Give special attention to cleaning control panels on the dialysis machines and other surfaces that are frequently touched and potentially contaminated with patients' blood.
- ◆ Discard all fluid and clean and disinfect all surfaces and containers associated with the prime waste (including buckets attached to the machines).
- ◆ For dialyzers and blood tubing that will be reprocessed, cap dialyzer ports and clamp tubing. Place used dialyzer and tubing in a leak-proof container for transport from station to reprocessing or disposal area.
- ◆ Masks, eye protection, or face shields must be worn whenever splashing is likely.
- ◆ Gowns or protective aprons should be worn when personal clothing may be soiled.
- ◆ Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

Disinfection procedures for commonly used items and surfaces

Item or Surface	Low Level Disinfection ^{a,b}	Intermediate Disinfection ^{a,c}
Gross blood spills or items contaminated with visible blood		X
Hemodialyzer port caps		X
Interior pathways of dialysis machine		X
Water treatment and distribution system	X	X ^d
Scissors, hemostats, clamps, blood pressure cuffs, stethoscopes	X	
Environmental surfaces (including exterior surfaces of hemodialysis machines)	X	

^a Careful mechanical cleaning to remove debris should always be done before disinfection.

^b Low level disinfection can kill most bacteria, some viruses, and some fungi, but it cannot be relied upon to kill hardy microorganisms such as tubercle bacilli or bacterial spores.

^c Intermediate level disinfection inactivates *Mycobacteria tuberculosis*, vegetative bacteria, most viruses, and most fungi, but it does not necessarily kill bacterial spores.

^d Water treatment and distribution systems of dialysis fluid concentrates require more extensive disinfection if significant biofilm is present within the system.

For more information, see section in this manual on Cleaning/Disinfection/ Sterilization. For information on EPA-registered disinfectants, go to <http://ace.orst.edu/info/nain/lists.htm>.

Precautions for Patients with ARMs

Additional precautions are required for patients who are at risk for transmitting ARMs. Such patients include those who have either:

- ◆ An infected skin wound with drainage that is not contained by dressings, or
- ◆ Fecal or urinary incontinence or diarrhea uncontrolled with personal hygiene measures.

These additional precautions include:

- ◆ Dialyze the patient at a station with as few adjacent stations as possible (e.g. at the end or corner of the unit).
- ◆ Dialyze patients with the same ARM in one area of the dialysis unit as much as possible.
- ◆ Staff who treat the patient should wear a separate gown over their usual clothing and remove the gown when finished caring for the patient.
- ◆ Provide adequate staff so that the caregiver of a VRE or MRSA patient does not need to respond to emergencies with other patients.
- ◆ When practical, have staff members provide care (1) only to patients with the same ARM, or (2) to patients *without* ARMs. This prevents staff from crossing over between infected and uninfected patients. This is called cohorting of staff.
- ◆ Instruct or assist patient to wash hands after using the toilet or touching body fluids or drainage.

Sources: Alter M, Tokars J. Preventing transmission of infections among chronic hemodialysis patients. *Nephrology Nursing Journal*. 2001;28:537-543,585.

Centers for Disease Control and Prevention. Recommendations for Preventing Transmission of Infections Among Chronic Hemodialysis Patients, *Morbidity and Mortality Weekly Report* April 27, 2001;50(RR05)1-43.

HOME CARE AND IN-HOME HOSPICE

(for hospice facilities see residential care with skilled nursing section)

Antibiotic Use & Immunization

Home care patients who are on antibiotics should be instructed and assisted to take their therapy exactly as prescribed. If serious side effects occur, the patient or home care provider should contact the patient's medical provider. Family members should also be instructed to never share or hoard (save for future use) antibiotics.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Adults over 50 and pregnant women who will be beyond the 1st trimester during flu season should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against both influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza morbidity in patients by reducing transmission. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age.

Infection Control

Home healthcare workers should focus on preventing cross-transmission via the clinical bag, clothing, and equipment that is carried to and from the home by the healthcare worker. Alternatively, the clinical bag may be left in the vehicle and only the disposable items used for the patient carried into the home. In general, reusable equipment must be cleaned either in the patient's home or bagged before returning to the healthcare worker's vehicle or facility. If potentially contaminated items from a patient's home must be transported by the caregiver, a designated "dirty area" in the vehicle should be maintained to achieve separation from clean items. Hands should be washed well when entering and before leaving the home. Environmental culturing is not necessary in the home environment.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hands should be washed upon entering and leaving the patient's home and whenever hands are visibly soiled. Paper towels should be used to dry care givers' hands after hand washing; the patient's or family

member's towels should not be used for this purpose. When sinks and running water are unavailable, use alcohol hand rub agents.

Barriers

Gloves should be used by home health nurses when providing direct patient contact. Family members and other care providers should also be instructed on appropriate use of gloves in the home, (e.g., direct patient care and handling of potentially infected secretions.) Gowns should be worn if there is risk of soiling with any body fluid.

Care of Equipment

Disinfect the stethoscope, thermometer, glucometer, and any other reusable equipment with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>) before returning these items to the bag. Use disposable items or dedicate equipment to the patient to be left in the home for the duration of treatment whenever possible. The home care provider should establish a safe working surface by placing a barrier such as paper towels or newspapers between environmental surfaces and the care provider's supply bag.

Education of Patient and Family

Family members and other care givers should be instructed in basic infection control concepts and procedures, including glove use. They should also be instructed to change and immediately wash their clothing if it becomes soiled with any body fluid. Patients should have antibacterial soap in the home and patient/family members should be instructed on appropriate hand washing. Patients and family caregivers should be taught the importance of promptly cleaning and disinfecting bathrooms and other environmental surfaces that may become contaminated with fecal material or other patient secretions. Use a household disinfectant to clean surfaces in the home at least twice a week or when they become visibly contaminated.

If the patient has an ARM, people with the following health conditions should not visit the patient's home:

- ◆ Recent *major* surgery (such as a transplant, open heart surgery)
- ◆ Chemotherapy
- ◆ Immunosuppression
- ◆ Currently or recently on long-term antibiotics

MEDICAL PROVIDER OFFICE/OUTPATIENT CLINIC

Antibiotic Use & Immunization

The most common complaint for which antibiotics are prescribed in the outpatient setting is acute upper respiratory infection (URI) including bronchitis, otitis media, rhinitis, sinusitis, pharyngitis, and cough illness, which often are of viral origin. Recent studies have found that approximately 55% of prescriptions these URIs may be inappropriate. Numerous studies establish a relationship between use of antibiotics and presence of resistant microorganisms. The primary care provider plays a pivotal role in either promoting or helping to control this problem.

Often, antibiotics may be prescribed because it is assumed that when patients come to clinic, they expect to leave with a prescription for antibiotics. However, recent studies have suggested that patient satisfaction is most dependent on the quality of the provider-patient interaction.

Clinical Practice Guidelines

Please refer to the appendix for clinical practice guidelines for treating common upper respiratory infections.

When considering antibiotic treatment the following general principles apply:

- ◆ Avoid prescribing antibiotics for uncomplicated illness most likely of viral origin.
- ◆ In cases of common respiratory illnesses, antibiotics should be used only when there is *evidence* of bacterial complications.
- ◆ Antibiotics are *not* effective in preventing secondary bacterial infections.
- ◆ Identify the pathogen, if possible. Pharyngitis should not be treated with antibiotics without documented presence of group A beta-hemolytic strep.
- ◆ Asymptomatic middle ear effusion (serous otitis media) should not be treated with antibiotics.
- ◆ If prescribing an antibiotic, choose the narrowest spectrum agent that will be effective.
- ◆ Avoid excess prophylactic antibiotics.
- ◆ Do not submit to patient pressure for antibiotics.
- ◆ Do not use antibiotics as antipyretics.

Appropriate Use of Pharmaceutical Samples

Samples provided by pharmaceutical companies are a convenient and quick way for a patient to get started on a course of antibiotics. However, there is the danger that the patient will not fill the prescription for the entire course of medication. If you give antibiotic samples to your patients and feel that a patient may not fill the prescription for the remaining doses, the Pierce County Antibiotic Resistance Task Force recommends that you consider giving samples for the entire course of therapy to prevent the development of antibiotic resistance.

If samples are given, write the prescription minus the number of doses that the sample will cover. The patient will then have the exact number of doses needed, and there will not be any left over to be taken

inappropriately at a later date. A printed message on a sticker affixed to the sample can serve as a reminder to patients about the importance of taking a full course of antibiotics. We suggest the message:

Have your antibiotic prescription filled for remaining doses as soon as possible. It is important to take all doses prescribed, even if you feel better, to prevent antibiotic resistance.

The usage of pharmaceutical samples should be tracked and supply inventory taken periodically to ensure appropriate use of the medications.

Teach patients

- ◆ Not to expect antibiotics for viral illnesses.
- ◆ There are potential dangers associated with unnecessary antibiotic use including antibiotic resistance *and* side effects.
- ◆ Not to save antibiotics for future illnesses, not to take "leftover" antibiotics, and not to share their prescriptions with others.
- ◆ Complete the full course of therapy.

Immunization

Immunizations can reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Adults over 50 years of age and pregnant women who will be beyond the 1st trimester during flu season should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against pneumococcal disease. Children should be immunized following ACIP/AAP recommendations, to include varicella and pneumococcal vaccine.

Infection Control

Infection Control Plan

It is recommended that each office/clinic develop a comprehensive, written infection control plan. It should include a surveillance plan for identifying and monitoring infections and for preventing transmission between patients and the staff, volunteers or visitors. The plan should include policies regarding hand washing, education, and environmental cleaning. The plan should also include reporting of communicable diseases as required by the State and local Health Departments. A member of the staff should be responsible for overseeing, reviewing and approving the activities of the infection control program.

Standard precautions (see below) should be used for all patients. Waiting areas should be screened for patients with productive coughs, draining wounds or other signs and symptoms of infection. Patients exhibiting such symptoms should be removed from the waiting area to an exam room as soon as possible. Once a patient has been identified with an ARM, subsequent visits to the office/clinic should be managed carefully. Any surfaces that may have had contact with the patient (e.g., blood pressure cuffs, examination table, stethoscopes) should be cleaned with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>) prior to use for another patient.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

Standard Precautions should be used during all encounters with all patients. These precautions are based on the assumption that any patient or client can be carrying an infectious microorganism of which neither the patient nor health care provider is aware.

Standard Precautions are designed to incorporate the protection against bloodborne pathogens achieved by *Universal Precautions* and the protection against other pathogens achieved by *Body Substance Isolation*. Standard Precautions are to be used for ALL patients, regardless of their diagnosis or presumed infectious status, when the health care worker comes into contact (or is at risk for contact) with any of the following: (1) blood, (2) all body fluids, secretions and excretions except sweat, (3) mucous membranes, and (4) non-intact skin.

Standard precautions consist of the following components:

- ◆ Hand washing / antisepsis should be done whenever hands are soiled, after removing gloves, and between all patient contacts.
- ◆ Single use disposable gloves must be worn whenever contact with patients' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out when gloves are removed.
- ◆ Masks, eye protection, or face shields must be worn whenever splashing or splatter is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled.
- ◆ Regular cleaning or disposal of patient care equipment and environmental surfaces with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).
- ◆ Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- ◆ Patients with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations

For more detail, see:

Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. *Infection Control and Hospital Epidemiology*. 1996;17:53-80. Available at: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>.

This article is also available in: *American Journal of Infection Control*. 1996;24:24-52.

PSYCHIATRIC FACILITIES

Psychiatric hospitals serve a very diverse group of people, including children and young adults with mental illness, forensic patients from jails/prisons, the elderly mentally ill with various medical issues, and traumatic brain-injured persons. The duration of care ranges from short term or diagnostic only to life-long custodial care.

Infection and colonization of patients in behavioral health facilities with antibiotic resistant microorganisms (ARMs) is becoming commonplace. In caring for a psychiatric patient with an ARM, actions to limit the spread must take into account the patient's physical functioning, mental status and psychological needs. Standard precautions and transmission-based precautions can be used and modified as necessary to remain compatible with the plan of care.

Because of the diverse types of settings encountered within the psychiatric realm, a single guideline would be inappropriate. Therefore, *the psychiatric facility provider is referred to the other sections of this manual that are appropriate for the type of facility or unit.* For example, the psychiatric center that is set up like a group home is referred to the “Residential Care Without Skilled Nursing Care” section. Likewise, a facility that cares for psychiatric patients who also have acute medical conditions is referred to the “Acute Care” and “Residential Care With Skilled Nursing Care” sections. Mixed settings may need to consult several sections of the manual.

There are circumstances that are unique to the psychiatric facility and these are discussed below, along with general guidelines to be followed by all facilities.

Antibiotic Use & Immunization

Guidelines for antibiotic use in the psychiatric facility will vary depending upon the type of setting. Recommendations that may apply are found elsewhere in this manual; specifically in the “Medical Provider Office/Outpatient Clinic” section, “Residential Care With Skilled Nursing” section, and guidelines for treating common URIs in the appendix.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Emphasis should be placed on immunizing adults against influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza morbidity in patients/residents. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age. Standing orders can increase immunization rates, although they do not eliminate the need to evaluate each patient individually for appropriateness and the presence of contraindications.

Infection Control

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.*

Hand washing or antisepsis should be done before and after contact with ALL patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

Standard Precautions should be used during all encounters with all patients/clients. These precautions are based on the assumption that any patient or client can be carrying an infectious microorganism of which neither the patient nor health care provider is aware.

Standard Precautions consist of the following components:

- ◆ Hand washing / antisepsis, as described above.
- ◆ Single-use disposable gloves must be worn whenever contact with patients' blood, body fluids, or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out when gloves are removed.
- ◆ Masks and eye protection or face shields must be worn whenever splashing is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled.
- ◆ Regularly dispose of or clean patient care equipment and environmental surfaces with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).
- ◆ Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- ◆ Patients/residents with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

Special Concerns Encountered in the Psychiatric Setting

- ◆ Hand washing should be practiced not only by health care workers but by psychiatric patients as well, who may have poor basic hygiene. Waterless alcohol-based hand sanitizers are extremely useful and should be encouraged for patients and health care workers.
- ◆ If a private room is not available, a patient with an ARM should be placed with a roommate who is not immunocompromised and does not have any open wounds or invasive devices.
- ◆ Housekeeping staff should be instructed to clean rooms of patients infected with ARMs *last*, so that contaminated end-of-day/shift cleaning equipment is laundered before next use.

- ◆ If possible, dedicate equipment such as a stethoscope and blood pressure cuff to the patient with an ARM. If dedicating equipment is not possible, disinfecting after use is essential. Communal geriatric chairs should also be disinfected after each use.
- ◆ Patients with ARMs can be fully integrated within the ward milieu and other communal activities if the microorganism can be contained adequately to prevent spread. This depends upon the site of infection and patient's self-care abilities.
- ◆ If the site of ARM infection is a wound, a wound dressing should be in place to contain any drainage.
- ◆ If the site of ARM infection is stool or urine and the patient is incontinent, s/he should be clean and wear an incontinence product when leaving his/her room. It is preferable that personal hygiene take place in the patient's room rather than in a communal bathroom.
- ◆ All residents with ARMs should wear clean clothes or a clean cover gown when leaving their rooms.
- ◆ A patient with an ARM in the sputum should be evaluated for presence of cough and ability to control the cough. It may be necessary to restrict movement outside the room until active coughing had diminished.
- ◆ An ambulatory, confused patient who frequently touches an infected wound requires special attention. If keeping the patient in his/her room causes undue mental trauma, extra attention to environmental cleaning and hand washing is needed.
- ◆ For patients who use communal showers, spray the shower stall down with a disinfectant before the next use.
- ◆ Rehabilitation and recreation staff must have good access to cleaning supplies and disinfectants and should clean equipment after each use.
- ◆ Leather restraints: cleaning protocols should already be in place and must be followed when used on a patient with an ARM infection. If available and safe, non-leather restraints are preferable because they can be machine-washed and dried.

RESIDENTIAL CARE FACILITY WITH SKILLED NURSING CARE (Adult or Child)

Antibiotic Use & Immunization

Infections in residential settings such as long-term care are, unfortunately, a relatively common occurrence. An increasing proportion of these infections are caused by antibiotic-resistant pathogens. Therefore, reducing the incidence of nosocomial infections and limiting antibiotic use are key to reducing antibiotic resistance.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Emphasis should be placed on immunizing adults in long-term care settings against influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza morbidity in long-term care residents. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age. Standing orders can increase immunization rates, although they do not eliminate the need to evaluate each resident individually for appropriateness and the presence of contraindications.

Evaluation of infections in residents of long-term care facilities (LTCFs) can be particularly difficult, given complex medical histories and altered mental status in some residents. Treatment decisions often must be made without the benefit of laboratory cultures. Evidence-based practice guidelines can assist the clinician in diagnosing viral vs. bacterial illness and in choosing empiric treatment, with the goal of preserving the power of antibiotics.

Recommended Minimum Criteria for the Initiation of Antibiotics in Residents of Long-term Care Facilities

Criteria for initiation of antibiotics in residents of long-term care facilities were released in 2001 by a consensus conference. These are summarized below. The full recommendations are available in: Loeb M, Bentley DW, Bradley S, et al. Development of minimum criteria for the initiation of antibiotics in residents of long-term care facilities: Results of a consensus conference. *Infection Control and Hospital Epidemiology*. 2001;22:120-124. Note that these are general guidelines; professional clinical judgement should always be used.

Skin and Soft-Tissue Infections - Minimum criteria for initiating antibiotic therapy:

- ◆ New or increasing purulent drainage at a wound, skin, or soft-tissue site
- ◆ Or at least 2 of the following:
 - (1) fever (temperature $>37.9^{\circ}\text{C}$ [100°F] or an increase of 1.5°C [2.4°F] above baseline temperatures taken at any site)
 - (2) redness

- (3) tenderness
- (4) warmth
- (5) swelling that was new or increasing at the affected site.

Note: these minimum criteria do not apply to patients with burns.

Respiratory infections- Minimum criteria for initiating antibiotic therapy:

- ◆ Febrile (temperature $> 38.9^{\circ}\text{C}$ [102°F]) with a suspected lower respiratory infection: either respiratory rate >25 breaths per minute or productive cough
- ◆ Febrile (temperature $>37.9^{\circ}\text{C}$ [100°F] or a 1.5°C [2.4°F] increase above baseline but $\leq 38.9^{\circ}\text{C}$ [102°F]): presence of a cough and at least one of the following:
 - (1) pulse >100
 - (2) delirium
 - (3) rigors (shaking chills)
 - (4) respiratory rate >25
- ◆ Afebrile resident *with* chronic obstructive pulmonary disorder (COPD), age >65 : new or increased cough with purulent sputum production
- ◆ Afebrile resident *without* COPD: new cough with purulent sputum production and respiratory rate >25 breaths per minute or delirium

Comment: If chest radiograph shows a new infiltrate thought to be pneumonia, minimum criteria for initiating antibiotics are either respiratory rate >25 breaths per minute, or productive cough, or fever (temperature $> 37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above the baseline temperature)

Urinary Tract Infections - Minimum criteria for initiating antibiotic therapy:

- ◆ Residents *without* an indwelling catheter: acute dysuria alone or fever ($>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline) *and* at least one of the following:
 - (1) new or worsening urgency
 - (2) frequency
 - (3) suprapubic pain
 - (4) gross hematuria
 - (5) costovertebral angle tenderness
 - (6) urinary incontinence
- ◆ Residents *with* a chronic indwelling catheter: one of the following:
 - (1) fever ($>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline temperature)
 - (2) new costovertebral tenderness
 - (3) rigors (shaking chills) with or without identified cause
 - (4) new onset of delirium

Fever Where the Focus of Infection is Unknown

- ◆ Temperature $>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline and either new onset of delirium or rigors

[End of recommendations from Loeb article]

It is recommended that vital signs (temperature, heart rate, respiratory rate, and blood pressure) and a complete blood count with differential be assessed in all patients with suspected infections.

Infection Control

Admission to licensed facilities should not be denied because the patient is colonized or infected with an ARM.

Infection Control Plan

It is recommended that every health care facility develop a comprehensive, institution-specific, written infection control plan. It should include a surveillance plan for identifying and monitoring infections and for preventing transmission between residents, staff, volunteers, and visitors. The plan should include policies regarding hand washing, education, isolation precautions, environmental cleaning, patient placement, and group activities. The plan should also include reporting of communicable diseases as required by the State and local Health Departments. A member of the staff should be responsible for overseeing, reviewing and approving the activities of the infection control program.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.* Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Standard Precautions

Standard Precautions should be used during all encounters with all residents. These precautions are based on the assumption that any resident can be carrying an infectious microorganism of which neither the patient nor health care provider is aware.

Standard Precautions are designed to incorporate the protection against bloodborne pathogens achieved by *Universal Precautions* and the protection against other pathogens achieved by *Body Substance Isolation*. Standard Precautions are to be used for ALL residents, regardless of their diagnosis or presumed infectious status, when the health care worker comes into contact (or is at risk for contact) with any of the following: (1) blood, (2) all body fluids, secretions and excretions except sweat, (3) mucous membranes, and (4) non-intact skin.

Standard Precautions consist of the following components:

- ◆ Hand washing / antisepsis, as described above.
- ◆ Single-use disposable gloves must be worn whenever contact with patients' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out when gloves are removed.
- ◆ Masks and eye protection or face shields must be worn whenever splashing is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled.
- ◆ Regular cleaning or disposal of patient care equipment and environmental surfaces with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).

- ◆ Residents with poor hygienic practices who contaminate the environment may require additional precautions.
- ◆ Safe disposal of sharps including needles must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

Contact Precautions

Although Standard Precautions and hand antisepsis are sufficient for most residents with ARMs, Contact Precautions (see below) may be indicated for residents with ARMs who are more likely to shed resistant bacteria into their environment. Residents who should be on Contact Precautions include the following:

- ◆ Residents who have ARM-infected or colonized wounds that cannot be covered fully by dressings or who have drainage that cannot be contained by dressings.
- ◆ Residents with fecal or urinary carriage of ARMs whose urine or stool cannot be contained in incontinence products, urine bags or ostomy bags.
- ◆ Residents with a tracheostomy who have an ARM-colonized or infected respiratory tract and significant amounts of uncontained respiratory secretions.
- ◆ Residents who have been epidemiologically linked to ARM infections in other residents (or additional residents if an ARM outbreak occurs).

Contact Precautions include the following:

- ◆ Wear gloves at all times while in the resident's room; change after contact with infective material.
- ◆ Wear a gown when entering the room if you anticipate your clothing coming in contact with the patient, environmental surfaces or items in the room, or if the resident is incontinent, has an ileostomy or colostomy, has diarrhea, or wound drainage not contained by a dressing. Remove gown and place it in a trash container (or laundry hamper if reusable) before leaving the room and wash hands. Avoid recontaminating the hands after washing (e.g. by touching a doorknob).
- ◆ Limit resident transport within the facility.
- ◆ Dedicate the use of non-critical equipment (such as stethoscope, blood pressure cuff, and thermometer) to a single resident or group of residents with the same ARM. If use of common equipment is unavoidable, then item must be cleaned and disinfected prior to use on another resident.
- ◆ The caregiver should wear a mask if the resident has MRSA and is coughing.

Room Placement

- ◆ It is ideal to place the resident who has an ARM in a private room. If this is not possible, the roommate should have no open wounds or invasive devices (tracheostomy, nasogastric tube, IV lines, foley catheter, etc.).
- ◆ The roommate should also not be immunocompromised. Examples of this includes someone who had an organ transplant, is on chemotherapy, has a chronic infection or infectious disease, or is receiving steroid medication.
- ◆ The roommate MAY have the same ARM, but should not have a different organism as the cause of infection.

Group Activities

Residents with ARMs may use common living areas, recreational areas, and group dining facilities. Such activities serve an important purpose in maintaining quality of life for LTCF residents. Control measures that limit resident activity and movement, such as those used in the acute care setting, are

generally not necessary and may result in emotional and social deprivation in the LTCF setting. The following factors should be considered in terms of group activities:

- ◆ Hand antisepsis is a very important component of participation in group activities. Residents with ARMs should have their hands cleaned with antibacterial soap or a waterless alcohol based hand antiseptic prior to leaving their room and whenever they again become contaminated when out of their room.
- ◆ Residents with ARMs should have clean, dry wound dressings that adequately contain any drainage. Residents with ARMs (e.g., VRE) in stool or urine who are incontinent of either should be clean and wear an incontinence product when leaving their room. In addition, all residents with ARMs should wear clean clothes or a clean cover gown when leaving their rooms.
- ◆ Residents with ARMs who are cognitively or behaviorally impaired and cannot maintain hygienic practices present additional challenges. However, in most cases strategies can be devised that will address infection control issues as well as allow the resident the opportunity for movement and socialization. In rare cases some restriction of movement may be necessary (see indications for contact precautions, above).

Environmental Cleaning

- ◆ **Room cleaning** - Standard facility procedures can be followed for cleaning the rooms of residents with MRSA and VRE. Use of the facility's standard disinfectant is adequate, but it is important to monitor compliance with manufacturer's recommended application procedures and contact times. Careful attention to cleaning of hand-touch areas such as doorknobs is vital.
- ◆ **Physical and recreational therapy equipment** - The hands of residents with ARMs should be cleaned before the resident uses recreational or physical therapy equipment. Standard facility procedures should be followed for routine cleaning and disinfection of recreational and physical therapy equipment used by residents with ARMs.
- ◆ **Trash disposal** - Follow standard facility procedures for trash disposal, no special handling is necessary.

Shared Bathrooms, Showers, Tubs

- ◆ **Bathrooms** - In situations where a resident with an ARM shares a bathroom with a roommate who does not have the same ARM, the bathroom should be cleaned and disinfected using standard facility procedure (daily and when visibly soiled). Commodes may be useful for certain residents with ARMs and should not be shared with roommates who do not have the same ARM.
- ◆ **Showers, tubs** - Shared tubs and showers should be cleaned and disinfected per standard facility procedure after use by residents with ARMs. It may be practical to bathe residents with ARMs after other residents.

Dishes and Eating Utensils

- ◆ No special precautions are needed for dishes, glasses, cups or eating utensils. The combination of hot water and detergents used in institutional dishwashers, if used properly, is sufficient to decontaminate these items.

Laundry

- ◆ Standard precautions are adequate for handling laundry from all residents. However, soiled laundry, especially bed linens and towels from residents with uncontained stool, urine or other secretions should be handled in such a way as to minimize contamination of staff and the environment. Gloves and long sleeved gowns should be worn when changing the beds of

residents with uncontained stool, urine or other secretions and all soiled laundry should be placed directly in a moisture resistant container and not on the floor or other room surfaces. Special handling (i.e., double bagging, etc.) is not necessary. Laundry should *not* be rinsed at point of use.

- ◆ Laundry staff should wear gloves and long sleeved gowns when sorting laundry. No special laundering procedure is required.

Decolonization

- ◆ Routine decolonization for MRSA is not recommended for LTCF residents at this time. Decolonization therapy for MRSA may result in the emergence of resistance to the agents used and since recolonization is common, decolonization has had little impact on the incidence of infections experienced by LTCF residents.
- ◆ There is no proven decolonization regimen for VRE. Among LTCF residents, VRE colonization is likely to persist for extended periods of time.

For more information, see:

Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. *Infection Control and Hospital Epidemiology*. 1996;17:53-80. Available at: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>.

This article is also available in: *American Journal of Infection Control*. 1996;24:24-52. Available at: <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>.

RESIDENTIAL CARE FACILITY WITHOUT SKILLED NURSING CARE

(Assisted Living, Retirement Center, Adult Family Home, Boarding home)

Antibiotic Use & Immunization

Upper respiratory infections (URIs) such as the common cold are one of the most frequent illnesses for which people receive antibiotics. However, most URIs are caused by viruses, which are not killed by antibiotics, and taking an antibiotic unnecessarily can promote antibiotic resistance. Providers with prescriptive authority should refer to the appendix for guidelines on treating common URIs. Staff and residents should be educated to keep the following points in mind regarding treatment of URIs:

- ◆ The best ways to prevent URIs are (1) maintaining the immune system through a healthy diet, exercise, and stress-relief and (2) washing one's hands frequently, especially after using the bathroom or coughing.
- ◆ People without chronic illnesses usually do not need antibiotic treatment for sore throats, sinus infections, coughs, cases of bronchitis, or childhood ear infections. People with chronic illnesses may require antibiotics; this can be evaluated by a health care provider.
- ◆ Antibiotics should not be taken unnecessarily because they can cause side effects and promote antibiotic resistance.
- ◆ The common cold usually lasts about 10 days and gets better on its own.
- ◆ A person who has a cold should get plenty of rest, avoid alcohol and smoking, and drink lots of fluids.
- ◆ If an antibiotic is given, it should be taken exactly as prescribed until it is all gone (stopping it too soon allows resistant bacteria to take over).
- ◆ Never save leftover antibiotics for later use or share them with other people.

Immunizations can reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Adults over 50 years old should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against both influenza and pneumococcal disease. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age.

Infection Control

Admission should not be denied on the basis of colonization with an antibiotic-resistant organism. These residents are usually ambulatory and not bed-bound. Since these residents require minimal assistance with activities of daily living and have few invasive devices (e.g., foley catheters), additional precautions beyond Standard Precautions are unnecessary unless a cluster of facility-acquired infections

is recognized. Hand washing education should be emphasized in employee and staff education. Consult your local Health Department if a cluster is recognized.

Hand washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.* Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Room Placement for Residents with ARMS

There is no requirement that residents with ARMs be placed in a private room. If there is a roommate the following should be considered:

- ◆ The roommate should not have any open areas, surgical wounds, or drains.
- ◆ The roommate should not be immunocompromised. Examples of this includes someone who has had an organ transplant, is on chemotherapy, has a chronic infection or infectious disease, or is receiving steroid medication.
- ◆ The roommate MAY have the same ARM, but should not have a different organism as the cause of infection.

Precautions

- ◆ Remind resident and family about frequent hand washing .
- ◆ Cover wounds with a clean, dry dressing .
- ◆ If the resident cannot control urine and bowel movements, provide pads or briefs to contain drainage.
- ◆ Usual cleaning methods and practices are advised for the environment.
- ◆ If the resident uses physical or recreational equipment, ensure that the resident washes his/her hands before and after use.
- ◆ If the resident soils equipment or furniture, clean it before another resident uses it.
- ◆ Trash can be handled in the usual method.
- ◆ Showers and tubs should be cleaned between residents.
- ◆ Assign a commode to the resident with ARM. If this is not possible, clean and disinfect the commode or toilet before another resident uses it.
- ◆ Dishwashing – the usual procedure is all that is necessary for cleaning dishes, glasses, cups and eating utensils.
- ◆ Soiled laundry, especially bed linens and towels, from residents with uncontained stool, urine, or other body fluids, should be handled in such a way as to limit contamination of staff and the environment.
- ◆ Gloves and long-sleeved gowns should be worn when changing beds for residents with uncontained stool, urine, or other body fluids. The soiled linen should be placed directly into a moisture-resistant container and not on the floor or other surfaces in the room. It is not necessary to double bag or rinse the linen at the point of use.
- ◆ Laundry staff should wear gloves and long-sleeved gowns when sorting laundry. No special procedures for washing are required.

- ◆ Residents with ARMs and their family and visitors need to receive information about their condition to the extent they can understand. A patient education brochure that can be photocopied is in the appendix.

See also: Washington Administrative Code (WAC) for Boarding Homes, 388-78A, last updated 12/14/99 and Washington Administrative Code (WAC) for Adult Family Homes, 388-76, last updated September 1998. Both are available at: <http://slc.leg.wa.gov/wacbytitle.htm>.

SCHOOL/CHILD CARE

Antibiotic Use & Immunization

Upper respiratory infections (URIs) such as sore throats, coughs, bronchitis, and ear infections are some of the most frequent illnesses for which children receive antibiotics. However, most of these conditions are caused by viruses, which are not killed by antibiotics. Taking an antibiotic unnecessarily can promote antibiotic resistance. The Task Force makes the following recommendations:

- ◆ Do not encourage the use of antibiotics for mild upper respiratory tract infections in otherwise healthy children.
- ◆ If a child is on antibiotics, instruct the child and family to use them exactly as prescribed.
- ◆ Teach children and parents not to take someone else's medication or hoard (save for later use) antibiotics.
- ◆ Have a clear, written policy on if and how you will give children medications.
- ◆ If your policy is to not give medication, suggest parents come in to give them.
- ◆ You should not require a child to take an antibiotic before returning to school or child care – this decision is up to the child's health care provider. The only exception to this may be when the child is proven to have strep throat by a throat culture.
- ◆ Encourage parents to have their children immunized with all recommended vaccines.
- ◆ The school or child care center should maintain up-to-date immunization records for all children
- ◆ Staff should also be encouraged to keep their immunizations up to date.

Infection Control

There are no national guidelines for addressing the issue of antibiotic-resistant bacteria in school and child daycare settings. Transmission of antibiotic resistant bacteria has been documented in a few situations. MRSA was transmitted among high school wrestlers, probably because they had close contact and skin abrasions. In most cases, transmission requires direct contact with contaminated material, including the following:

- ◆ MRSA: Skin or respiratory secretions or material from an infected site.
- ◆ VRE: Stool, urine, or material from an infected site.

Subsequently, persons whose hands are contaminated with these organisms can transmit them to another person.

In most school and child care settings children do not have any specific risk factors for acquiring infections with these bacteria or of having serious infections should transmission occur. *However, good hygienic practices are important at all times.* The Task Force offers the following guidelines for workers in the school and daycare setting.

Hand Washing

- ◆ Instruct or assist children to wash their hands after using the restroom, before eating, after playing on the playground, and before going home.
- ◆ Do not assume children know how to wash their hands properly. Supervision, especially in a daycare setting is essential in forming good hand washing habits in children.
- ◆ Do *not* use the same damp cloth to wash a group of children's hands.
- ◆ Do *not* use a standing basin of water to rinse hands.
- ◆ Thoroughly rinse and dry hands. Do not use a common hand towel. Always use disposable towels in child care or food preparation settings.
- ◆ Children learn by example. Let them observe good hand washing technique from adults.
- ◆ Staff should always wash their hands before eating, touching food, preparing bottles, giving medications, and after handling pets, using the rest room, changing diapers, or assisting children with toileting, and before going home.

Environmental Cleaning

- ◆ Use disposable cleaning cloths. If reusable cloths are used, they must be laundered on a regular basis, adding chlorine bleach to the wash water.
- ◆ Avoid using sponges. Germs thrive on moist surfaces.
- ◆ Staff should wear gloves when cleaning spills of urine, feces, vomit, etc.
- ◆ Surfaces contaminated by a child's secretions should be cleaned and disinfected with a household disinfectant.
- ◆ Use chairs and other furniture that can be easily cleaned; avoid fabric furniture.
- ◆ Wash plastic toys in a bleach solution (1 teaspoon bleach in 1 gallon of water) or in a dishwasher, and wash cloth toys in a washing machine.

Laundry and Waste Management

- ◆ Clothing, linens, and towels that are heavily soiled with body fluids should be washed by themselves in detergent and bleach. Articles that are not soiled with body fluids can be washed with other clothing.
- ◆ Place all disposable wastes like dressings and bandages into plastic bags. Tie the bags securely and discard them with the regular trash.

Eating and Treatment of Eating Utensils

- ◆ Staff who prepare food must wash their hands thoroughly before touching the food or equipment.
- ◆ Consider using prepackaged snacks.
- ◆ Do not allow children to share dishes and utensils or take bites of another child's food.
- ◆ Make sure children wash their hands before eating.
- ◆ A dishwasher is the preferred method for washing, rinsing, and disinfecting dishes and eating utensils.
- ◆ If your facility does not have a dishwasher, wash the dishes with dish soap and hot water and disinfect with a bleach solution for at least 1 minute (1 teaspoon liquid bleach for each gallon of water). *This recommendation is for ALL dishes and utensils used by all staff and students.*

Education of Children and Parents

- ◆ Teach children to cover their mouths with a tissue or their arm when coughing or sneezing (coughing into the hand allows germs to be spread by the hands).
- ◆ Encourage parents to keep their children's immunizations up-to-date.

- ◆ Recommend that parents have their children immunized against pneumococcal disease.

Treatment of Children with an Antibiotic Resistant Organism

- ◆ Students *colonized* with antibiotic resistant organisms (ARMs) *should not be* excluded from school or child care. “Colonized” means that the child carries the organism but is *not* sick with it.
- ◆ Students *infected* with an ARM should be under appropriate medical treatment. “Infected” means that the child carries the organism and *is* sick with it.
- ◆ In situations when infected students (*or colonized students who are unable to control secretions*) need to participate in school or child care, the school should follow clinical guidelines for preventing transmission. These may include the use of designated environmental space, and/or exclusion from activities where direct contact may occur (e.g., wrestling).
- ◆ If the child is too sick to participate in normal activities, s/he should be excluded.

See also:

Infectious Disease Control Guide for School Staff which is available from the Office of Superintendent of Public Instruction. Contact Health Services, 360-753-2744.

SCHOOL OR RESIDENTIAL CARE FOR PHYSICALLY OR MENTALLY CHALLENGED

(Adult or Child)

Antibiotic Use & Immunization

Upper respiratory infections (URIs) such as the common cold are one of the most frequent illnesses for which people receive antibiotics. However, most URIs are caused by viruses, which are not killed by antibiotics, and taking an antibiotic unnecessarily can promote antibiotic resistance. Providers with prescriptive authority should refer to the appendix for guidelines on treating common URIs. Staff and residents/students should be educated to keep the following points in mind regarding treatment of URIs:

- ◆ The best ways to prevent URIs are (1) maintaining the immune system through a healthy diet, exercise, and stress-relief and (2) washing one's hands frequently, especially after using the bathroom or coughing.
- ◆ People without chronic illnesses usually do not need antibiotic treatment for sore throats, sinus infections, coughs, cases of bronchitis, or childhood ear infections. People with chronic illnesses may require antibiotics; this can be evaluated by a health care provider.
- ◆ Antibiotics should not be taken unnecessarily because they can cause side effects or promote antibiotic resistance.
- ◆ The common cold usually lasts about 10 days and gets better on its own.
- ◆ A person who has a cold should get plenty of rest, avoid alcohol and smoking, and drink lots of fluids.
- ◆ If an antibiotic is given, it should be taken exactly as prescribed until it is all gone (stopping it too soon allows resistant bacteria to take over).
- ◆ Never save leftover antibiotics for later use or share them with other people.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Emphasis should be placed on immunizing adults against influenza and pneumococcal disease. In addition, immunizing staff with influenza vaccine can reduce influenza morbidity in residential care residents. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age.

Infection Control

In caring for a physically or mentally challenged student with an antibiotic resistant microorganism (ARM), it is important to know where the infection is located, for example on the skin or in the urine, stool, or lungs. Depending on the location, action can be taken to contain the infectious organism, such as by covering wounds with dressings and/or clothing or providing a device to contain stool or urine for

an incontinent student. Risk factors for ARM in this setting include: underlying illness, intravenous catheters, urinary catheters, enteral feeding devices, prior antibiotic use, wounds, and decline in ability to perform activities of daily living.

Hand Washing / Antisepsis

Antibiotic resistant microorganisms (ARMs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for ARM transmission is hand washing or antisepsis (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand washing.* Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand washing or cleansing the hands with a waterless alcohol-based hand antiseptic can be done.

Precautions

The following precautions should be used when caring for residents/students with ARMs:

- ◆ Hand washing / antisepsis, as described above.
- ◆ Wash or have resident/student wash their hands before joining group activities.
- ◆ Cover any wounds with a clean, dry dressing.
- ◆ If resident/student cannot control urine or bowels, s/he should wear clothing that contains urine or bowel movements.
- ◆ Use gloves whenever contact with resident's/students' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand washing/antisepsis must be carried out after removing gloves.
- ◆ Masks, eye protection, or face shields must be worn whenever splashing of body fluids is likely.
- ◆ Gowns or protective aprons are to be worn when personal clothing may be soiled.
- ◆ Instruct the resident/student regarding how to prevent contamination of school materials that are to be reused by others (e.g., cover mouth when coughing, wash hands prior to using school materials).
- ◆ Shared items such as computer keyboards must be cleaned with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>) prior to use by another individual. When possible, these items should be assigned to the resident/student with an ARM as long as the person requires the items, and then cleaned and disinfected prior to reuse by another resident or student. Items that cannot be disinfected such as books should be dedicated to the person and not used subsequently by anyone else if possible.
- ◆ Regularly clean all environmental surfaces.
- ◆ Laundry that contains bowel movements, urine and anything wet coming from a resident or student with an ARM should be placed in a plastic lined laundry bag. When handling contaminated laundry, staff should wear gloves and gowns.
- ◆ Usual dishwashing procedure is all that is necessary for cleaning dishes, glasses, cups and plates.
- ◆ Trash can be handled in the usual method.
- ◆ Students/residents with poor hygienic practices or those with tracheostomies who have an ARM in the sputum and respiratory secretions that cannot be contained may require additional precautions. Call your local health department for advice on additional precautions.

VETERINARY MEDICINE

Antibiotic Use

Antimicrobials are important therapeutic agents used to treat and control disease in animals. The use of these agents is necessary for animal welfare and for the maintenance of an abundant, wholesome and safe food supply. Appropriate use of antimicrobials in the veterinary setting will minimize the emergence and maintenance of resistant organisms in animals and will ensure the efficacy of antibiotics in humans and animals for the future.

The Pierce County Antibiotic Resistance Task Force recommends that veterinarians implement the principles outlined in the American Veterinary Medical Association (AVMA) Judicious Therapeutic Use of Antimicrobial Guidelines (reprinted below). In addition to these general guidelines, specific guidelines for judicious antibiotic use in cattle, poultry, swine, horses, dogs, and cats are available at the AVMA's website, www.avma.org.

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American Veterinary Medical Association Judicious Therapeutic Use of Antimicrobials (AVMA Executive Board — November 1998)

Position Statement

When the decision is reached to use antimicrobials for therapy, veterinarians should strive to optimize therapeutic efficacy and minimize resistance to antimicrobials to protect public and animal health.

Objectives

- ◆ Support development of a scientific knowledge base that provides the basis for judicious therapeutic antimicrobial use.
- ◆ Support educational efforts that promote judicious therapeutic antimicrobial use.
- ◆ Preserve therapeutic efficacy of antimicrobials.
- ◆ Ensure current and future availability of veterinary antimicrobials.

Strategies

- ◆ Facilitate development and distribution of appropriate antimicrobial use guidelines by practitioner species-interest groups.
- ◆ Improve scientifically based therapeutic practices through education.

Recognized Needs

- ◆ Improved monitoring and feedback systems for antimicrobial use and resistance patterns.
- ◆ Research to improve scientifically based therapeutic practices.

Judicious Use Principles

- ◆ Preventive strategies, such as appropriate husbandry and hygiene, routine health monitoring, and immunization, should be emphasized.
- ◆ Other therapeutic options should be considered prior to antimicrobial therapy.

- ◆ Judicious use of antimicrobials, when under the direction of a veterinarian, should meet all requirements of a valid veterinarian-client-patient relationship.
- ◆ Prescription, Veterinary Feed Directive, and extralabel use of antimicrobials must meet all the requirements of a valid veterinarian-client-patient relationship.
- ◆ Extralabel antimicrobial therapy must be prescribed only in accordance with the Animal Medicinal Drug Use Clarification Act amendments to the Food, Drug, and Cosmetic Act and its regulations.
- ◆ Veterinarians should work with those responsible for the care of animals to use antimicrobials judiciously regardless of the distribution system through which the antimicrobial was obtained.
- ◆ Regimens for therapeutic antimicrobial use should be optimized using current pharmacological information and principles.
- ◆ Antimicrobials considered important in treating refractory infections in human or veterinary medicine should be used in animals only after careful review and reasonable justification. Consider using other antimicrobials for initial therapy.¹
- ◆ Use narrow spectrum antimicrobials whenever appropriate.
- ◆ Utilize culture and susceptibility results to aid in the selection of antimicrobials when clinically relevant.
- ◆ Therapeutic antimicrobial use should be confined to appropriate clinical indications. Inappropriate uses such as for uncomplicated viral infections should be avoided.
- ◆ Therapeutic exposure to antimicrobials should be minimized by treating only for as long as needed for the desired clinical response.
- ◆ Limit therapeutic antimicrobial treatment to ill or at risk animals, treating the fewest animals indicated.
- ◆ Minimize environmental contamination with antimicrobials whenever possible.
- ◆ Accurate records of treatment and outcome should be used to evaluate therapeutic regimens.

¹ In this context, this principle takes into account development of resistance or cross-resistance to important antimicrobials.

Veterinarian/Client/Patient Relationship (VCPR) -- A VCPR exists when all of the following conditions have been met:

1. The veterinarian has assumed the responsibility for making clinical judgements regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.
2. The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises where the animal(s) are kept.
3. The veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment regimen.

Veterinary Feed Directive (VFD) Drug--The VFD category of medicated feeds was created by the Animal Drug Availability Act of 1996 to provide an alternative to prescription status for certain therapeutic animal pharmaceuticals for use in feed. Any animal feed bearing or containing a VFD drug shall be fed to animals only by or upon a lawful VFD issued by a licensed veterinarian in the course of the veterinarian's professional practice.

[End of AVMA statement]

Infection Control

In 2001, the Centers for Disease Control and Prevention (CDC) published a report concerning multidrug-resistant *Salmonella* Typhimurium infections in employees and clients of small animal veterinary clinics. These outbreaks underscore the need for appropriate infection control guidelines to be in place at veterinary facilities. Veterinary workers should wash their hands after handling pets, especially after handling feces. Rubber or disposable gloves should be worn when dealing with feces or other potentially infective material. Workers should take care to reduce contact with splashes while hosing down kennels and holding areas. All surfaces contaminated with feces should be disinfected. Employees should not consume food or beverages in animal treatment or holding areas.

The Pierce County Antibiotic Resistance Task Force attempted, without success, to locate an animal infection control guideline published by a nationally-recognized veterinary organization. However, the American Animal Hospital Association (AAHA) generously provided the Task Force with a copy of unpublished standards that are used in their animal hospital accreditation process. Those standards that relate to infection control were extracted and are printed below, with permission from AAHA.

American Animal Hospital Association Selected Standards Related to Infection Control

- ◆ Proper protective apparel must be worn by all personnel performing therapeutic bathing and dipping.
- ◆ Nursing personnel **must** be trained in the principles of contagious nursing care. Proper hand washing between patients is considered to be the most effective way to prevent cross-contamination.
- ◆ The nursing staff **must** be familiar with the proper handling and disposal of all waste materials and the cleaning and disinfection of compartments, exercise areas, and runs.
- ◆ If the exterior exercise area cannot be easily cleaned, all fecal waste **must** be removed promptly.
- ◆ There are no specific ward requirements; however, all animal holding areas must be secure, escape-proof, and easily cleaned.
- ◆ All runs should be sloped and individually drained to prevent cross-contamination. If drained by a common trough, the trough **must** be covered.
- ◆ Concrete floors and runs **must** be well-sealed, clean, and in good repair.
- ◆ Cage doors and run gates **must** be clean and in good repair.
- ◆ All personnel **must** be trained and routinely monitored to ensure that medications are administered in accordance with the directions of the veterinarian.
- ◆ Accurate and complete records **must** be kept by personnel administering any kind of medication.
- ◆ Proper attire **must** be used for handling animals with contagious diseases. Proper attire includes disposable or easily disinfected gowns, disposable foot coverings or a means of disinfecting footwear, and disposable gloves.
- ◆ All contaminated materials **must** be double-bagged or decontaminated before removal from the area where a patient with infectious disease is housed or examined.
- ◆ The biomedical waste **must** be disposed of in accordance with federal, state, provincial, and local regulations.
- ◆ If a single-purpose isolation room exists, only the equipment and material for the care and treatment of the current patient within the isolation room may be kept therein.

- ◆ When and if animals with contagious diseases are hospitalized, they **must** be housed in a separate, single-purpose isolation room. When this room is not housing contagious patients, it may be used for other purposes if the room is sanitized in accordance with the Nursing Care Standard.
- ◆ Traffic in the isolation room **must** be restricted to the care of contagious patients.
- ◆ Following the use of a room for the isolation of animals with contagious diseases, all surface and cages **must** be thoroughly disinfected and all contaminated materials **must** be disposed of in accordance with the Housekeeping and Maintenance Standard.
- ◆ All cages and runs **must** be constructed in such a way that contamination from one animal to the next is controlled at all times.
- ◆ The partitions between the runs **must** be of solid construction and impervious material to a minimum height of 48 inches above the finished floor. Nose-to-nose contact above the partitions can be prevented by not housing large-breed dogs in adjacent runs.
- ◆ When and if animals with contagious airborne diseases are hospitalized, air from this area **must** be exhausted to the outside of the facility and not returned to the ventilation system.

Large animal practitioners should also refer to the Animal Agriculture section of this manual.

PATIENT DISCHARGED TO HOME

Antibiotic Use & Immunization

If a patient is discharged from a health care facility on antibiotics, instruct him/her to complete the therapy exactly as prescribed. If serious side effects occur, the patient should contact a health care provider.

Immunizations can effectively reduce the need for antibiotics by reducing the likelihood of certain illnesses that are either of bacterial origin or can mimic bacterial infections. Before discharging a patient to home, determine the patient's immunization status and ensure that s/he is fully immunized with all appropriate vaccinations before discharge. All adults over 50 years old should be considered for immunization against influenza. High-risk adults and all adults over 65 should be immunized against pneumococcal disease. Children should be immunized as appropriate for their age, following ACIP/AAP recommendations, to include pneumococcal conjugate vaccine (PCV) for all children age 2-23 months. Children with chronic illness should be considered for influenza vaccine (if ≥ 6 months of age) and pneumococcal vaccines as follows: PCV for those under 6 years of age, and polysaccharide pneumococcal vaccine (PPV) for those 2-18 years of age. In addition, it is recommended that persons who provide care to chronically ill individuals should receive influenza vaccine.

Infection Control

A patient colonized or infected with an ARM requires no special control measures beyond regularly cleaning all surfaces contaminated by secretions or touched by hands. Family members should inform healthcare facilities or providers of the patients' prior colonization or infection with an ARM. Family members should be instructed to perform hand washing with an antibacterial soap for a minimum of 10 seconds after direct contact with the patient or any items soiled with the patient's wound drainage or body fluids. All family members and the patient should be taught to wash their hands before preparing food, before eating, and after using the toilet. Friends and family who are immunosuppressed should avoid close physical contact with the patient who is colonized or infected with an ARM.

A patient education brochure which can be photocopied and distributed, can be found in the appendix.

COMMUNICATION BETWEEN FACILITIES WHEN TRANSFERRING A PATIENT

Communicating the patient's colonization or infection history is key to preventing further spread of resistant organisms. Discussing the patient's status with the receiving facility prior to transfer is imperative to ensuring appropriate room placement and continuity of infection control measures.

It is the responsibility of the facility transferring the patient to inform a receiving facility and the transportation personnel of the patient's status and what precautions should be taken. The Pierce County Antibiotic Resistance Task Force has developed a transfer form that can be used to assure that this information is communicated to those who need to know. A sample of this form is included in the appendix. The Task Force suggests that the form be printed on brightly colored paper and attached to the outside of the envelope containing the transfer paperwork as a flag to the receiving facility.

A receiving facility that discovers that a patient admitted from another institution is infected or colonized with an antibiotic resistant microorganism within 48 hours of admission should inform the transferring institution.

It is important that healthcare workers who may have direct contact with patients on transmission-based precautions be informed of appropriate control measures (e.g., protective garments/barriers) prior to room entry. Traditionally this has been accomplished by placing instructional cards on the patient's door and a label on the patient care record. Care must be taken to protect patient confidentiality.

Communication with other services within the facility, such as physical therapy or occupational therapy is important for infection control purposes. Health care personnel should offer factual information to other staff about resistant organisms, with the goal of preventing the spread of infection without causing unnecessary anxiety or over-reaction.

EDUCATION OF STAFF, PATIENTS, AND VISITORS

Staff Education

Continuing education programs for staff who have direct contact with residents/patients or items in their environment is strongly encouraged. Staff who are responsible for making decisions regarding the care of residents/patients should receive current information about ARMs and should thoroughly review the information presented in this guideline.

Information about ARMs can be included as part of periodic infection control and/or bloodborne pathogens training for staff. Education should include:

- ◆ colonization vs. infection.
- ◆ hand washing/antiseptics.
- ◆ isolation technique.
- ◆ decontamination of equipment, use of disposable equipment.
- ◆ methods to limit contamination with stool, urine, respiratory and wound secretions.
- ◆ specific ARMs.
- ◆ rationale for specific precautions.
- ◆ for nursing staff, an overview of prudent antibiotic use.

When educating staff about resistant organisms, it should be noted that healthy people are at very little risk of developing an infection with MRSA or VRE. In addition, there are no special precautions for pregnant staff that work with residents/patients with MRSA or VRE.

Resident/Patient, Family & Visitor Education

Education of residents/patients, family members, and visitors is essential to control the transmission of infections. Families, visitors, and other residents/patients must have sufficient education to alleviate their concerns, to ensure that precautions are maintained, and to understand that individuals with ARMs need not be avoided. Education should include information about:

- ◆ general principles related to hand washing or antiseptics.
- ◆ methods to limit contamination with stool, urine, respiratory and wound secretions.
- ◆ the specific ARM.
- ◆ reasons for the specific precautions associated with it.
- ◆ the expected duration the precautions will be needed.

In general, residents/patients should be instructed to cover their mouths when coughing, to practice good hand washing, and to not share food or drinks. Family and visitors should be encouraged to wash their hands when entering and leaving the room of a resident/patient.

If family or visitors handle any secretions, soiled clothing or linen, or if they provide any direct care such as bathing, they should wear gloves, remembering to wash their hands before putting the gloves on and after taking the gloves off. Friends and family who are immunosuppressed should avoid close physical contact with the patient who is colonized or infected with an ARM.

A brochure with information about resistant bacteria that can be given to patients and/or families is in the appendix.

CLEANING, DISINFECTION, AND STERILIZATION

A thorough discussion of cleaning and disinfection is beyond the scope of this manual. However, a few principles and resources are worthy of mention.

Antibiotic resistant microorganisms (ARMs) can be transmitted in some cases by objects such as thermometers, blood pressure cuffs, bedside commodes, and other equipment. In order to prevent the spread of ARMs, it is crucial that items that touch a person who has an ARM be properly decontaminated before touching another person.

There are three possible steps that can be taken to decontaminate an item to prepare it for reuse: (1) cleaning, (2) disinfection, and (3) sterilization. Cleaning must *always* be done; disinfection or sterilization may also be required depending upon the intended use of the item. For example, items that enter a sterile body site, such as surgical instruments, need a higher level of decontamination than items that only touch intact skin.

Cleaning is the removal of all foreign material such as soil, blood, or sputum, from an object. It is normally accomplished with water, mechanical action, and detergents or enzymatic products.

Disinfection is a process that eliminates many or all pathogenic microorganisms from inanimate objects, except for bacterial spores. It is usually accomplished through the use of chemicals or wet pasteurization.

Sterilization is complete elimination or destruction of all microorganisms. It is usually accomplished by either physical or chemical processes.

If an item needs to be disinfected or sterilized before reuse, it must be CLEANED before it is disinfected or sterilized. If foreign material is not removed from an object, the disinfection or sterilization process may not be effective. This is because the chemical or heat treatment, which is meant to kill microorganisms, may not penetrate the foreign material, leaving some microorganisms still viable.

Further information, including details on selecting appropriate methods can be found in: Centers for Disease Control and Prevention. Guideline for Handwashing and Environmental Control. *Mortality and Morbidity Weekly Report* August 21, 1987;36(2S) and *Mortality and Morbidity Weekly Report* June 24, 1988;37(24). Available at: <http://www.cdc.gov/ncidod/hip/guide/handwash.htm>.

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Information on EPA-registered disinfectants, sanitizers, and sterilants can be found at <http://ace.orst.edu/info/nain/lists.htm>.

ANIMALS IN THE HEALTH CARE OR RESIDENTIAL CARE SETTING

Animals – including service animals, therapy animals, and pets – can provide significant benefits to the quality of life of people inside and outside of health care settings. Service animals are trained to assist a person with a disability. The Americans with Disabilities Act (ADA) of 1990 contains provisions requiring health care facilities to accommodate service animals. Therapy animals are usually pets that provide supervised, goal-directed interventions to clients. Therapy animals are not protected by the ADA.

Because animals can act both as reservoirs and as the means of transmission of antibiotic resistant microorganisms (ARMs), care must be taken to (1) prevent animals from being colonized with ARMs, and (2) prevent them from spreading ARMs between patients. The following guidelines provide basic recommendations for preventing the spread of ARMs via animals in health care or residential care settings. Some restrictions may be prohibited by the ADA if the animal involved is a service animal.

- ◆ Before an animal begins visiting or living in a health care or residential facility, s/he should be screened by a veterinarian for infectious disease and temperament and should have all immunizations up to date. A screening form that the vet can use can be found at <http://www.deltasociety.org/petpart/pprnwh.htm>
- ◆ Staff, patient/residents, and visitors should wash their hands with soap and water after contact with animals or with items that have come in contact with an animal. Antibacterial soap is not necessary.
- ◆ Providers with dermatitis or lesions, sores, cuts, abrasions, or scratches on their hands should always wear gloves while handling animals.
- ◆ An animal should not come in contact with a patient or resident's non-intact skin, such as wounds, surgical sites, or drainage tubes.
- ◆ Animals should be monitored for episodes of vomiting, diarrhea, or other illnesses, which should be reported to the supervisor as well as the animal's veterinarian.
- ◆ If blood, feces, vomit, or urine from an animal contaminates an area or object, gloves should be worn during cleanup. A gown should be worn if soiling of clothes is anticipated. The material should be cleaned up by removal with paper towels and the area should be disinfected with an EPA-registered disinfectant (<http://ace.orst.edu/info/nain/lists.htm>).
- ◆ Cat litter boxes should be kept meticulously clean, with feces removed immediately and litter changed frequently. Persons who are immunocompromised or pregnant and those who cannot maintain proper hygiene such as hand washing should not have access to litter boxes.
- ◆ Do not allow animals to drink from toilets, eat feces, or eat garbage.
- ◆ Water and food bowls should be cleaned with soap and water frequently.
- ◆ Animals should not be allowed in the following areas (however, note that for service animals some of these restrictions might not apply): food preparation or storage areas, medication preparation or storage areas, clean/sterile supply storage, intensive care, operating rooms, labor and delivery rooms, pre-op and post-op recovery areas, and isolation rooms.

- ◆ Reptiles often carry *Salmonella*, and therefore in general are not recommended in the health care or residential care setting where persons may be particularly susceptible to infection. If reptiles are present, extra precautions should be taken including:
 - ◆ Do not allow the reptile to roam around while the reptile's container is being cleaned
 - ◆ Regularly disinfect the outside of the container where the reptile is kept
 - ◆ Never allow reptiles in food preparation areas
 - ◆ If sinks, bathtubs, or shower stalls are used for reptile operations (such as cleaning equipment), disinfect after use
- ◆ Special precautions may be prudent for persons who are immunocompromised.

For more information, see:

Washington Administrative Code 388-97-08070. Available at: <http://slc.leg.wa.gov/wacbytitle.htm>

Delta Society: www.deltasociety.org

Association for Professionals in Infection Control and Epidemiology: www.apic.org

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This manual was prepared by the Education Subcommittee of the Pierce County Antibiotic Resistance Task Force. Much of the material was generously provided by the Iowa Antibiotic Resistance Task Force, the North Carolina Statewide Program for Infection Control and Epidemiology, American Veterinary Medical Association, and American Animal Hospital Association. The Pierce County Antibiotic Resistance Task Force compiled and, in some cases, edited these materials. They also added a great deal of new material based on the medical literature, their combined expertise, and consultation with outside experts. Final preparation, editing, and layout were done by Task Force member Jean Wheeler and Tacoma-Pierce County Health Department employees Denise Stinson, Monica Raymond, and Shirley Knudson.

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APPENDIX A

[Patient Education Brochure](#)

APPENDIX B

Practice Guidance for Judicious Use of Antibiotics – Upper Respiratory Infections

APPENDIX C

[Patient Transfer Form](#)

